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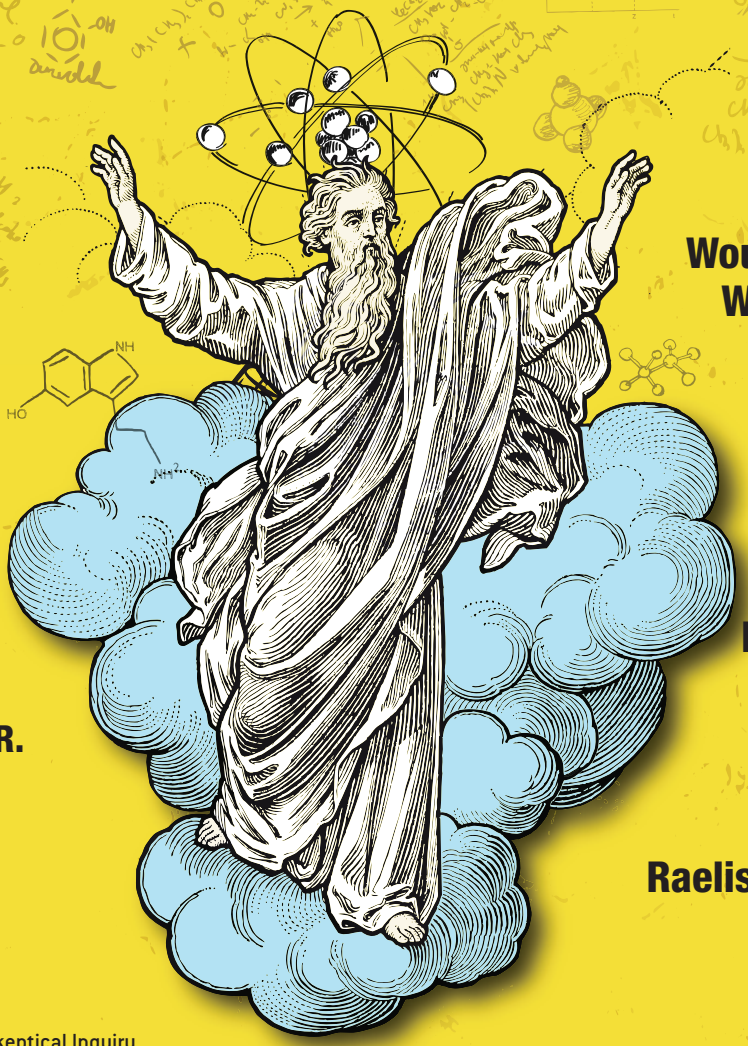
SPECIAL ISSUE

SCIENCE AND RELIGION



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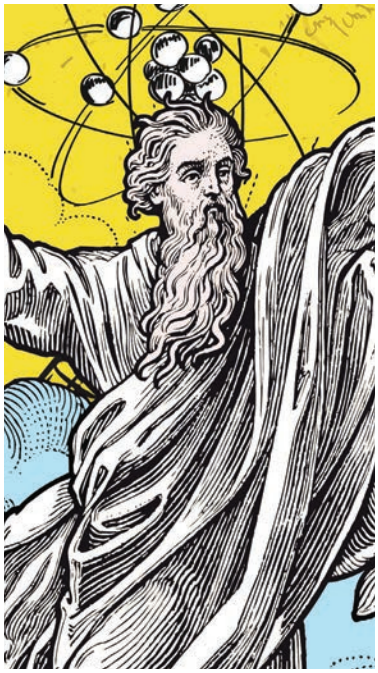

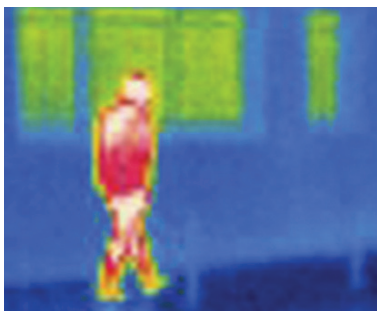

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[FROM THE EDITOR

Science and Religion: New Questions and Issues

This special issue is devoted to science and religion, our first in seven years. The intersections of science and religion are perennially troubled, but the articles in this issue explore some new territory. You may even find some surprises. Scientists, scholars, and science-minded skeptics—a fair description of most of our authors and readers—tend to be skeptical personally toward religion and all religious dogma, but their professional approaches to the subject vary widely. Those approaches may differ some from that of our friends who identify more as humanists, secularists, or atheists. As always, our emphasis is on scientific thinking about religious issues, new empirical data, and testable claims. I think you'll find a thoughtful and fairly nuanced set of articles here.

Would the world be better off without religion? That is the provocative topic of our lead article by psychology professor Scott O. Lilienfeld and postdoctoral fellow in psychiatry Rachel Ammirati, both at Emory University. Often the answer is taken as a given. Partisans on both sides speak with high confidence in their positions, but is that certainty justified? In their "Skeptic's Guide to the Debate," our authors counsel caution. They find that scientific data bearing directly on the question have routinely been ignored, yet the data show this to be a complex and multifaceted issue requiring a degree of humility on both sides. Lilienfeld, coauthor of such works as *50 Great Myths of Popular Psychology* and *Brainwashed: The Seductive Appeal of Mindless Neuroscience*, is well known in these pages (*Brainwashed* was excerpted as the cover article in our November/December 2013 issue). He is a Fellow and member of the Executive Council of the Committee for Skeptical Inquiry. This is Ammirati's first appearance in our pages.

Barry A. Kosmin presents results of particular interest to skeptics from the 2013 survey of religious attitudes of university students he directs for the Institute for the Study of Secularism and Society at Trinity College in Connecticut. Our Center for Inquiry partnered as a funder and intellectual contributor to the report. Kosmin finds three distinct but roughly equal-sized worldviews among a representative sample of today's university students: secular, spiritual but not religious, and religious. The secular are now a significant segment of young, educated Americans, and the survey finds their views closely mirror those of science-minded skeptics: overwhelmingly endorsing evolution, for instance, and skeptical of a number of traditional and alternative therapies.

Harriet Hall, MD, a frequent SI contributor, reviews the troubling issue of parents whose strong religious views cause them to reject medical treatment for their children. This is an increasingly troublesome conflict between freedom of religion and the duty of society to protect children. Historian Ryan Shaffer, another frequent contributor, reports on modern-day witch hunting and superstitious murder in India. You might think witchcraft murders were from another era, but 119 people in India were killed with that motivation in 2012, and the problem is almost endemic in certain rural areas. Mark Rubinstein writes about Raelism, one of the strangest new religions (founded only in 1974). It invokes extraterrestrials and telepathy, but Rubinstein finds many parallels with Christianity. Finally, chemistry professor and author Charles M. Wynn Sr. compares the scientific and religious paradigms and calls for greater sensitivity and understanding if we want to persuade people to give up beliefs they hold dearly.

—Kendrick Frazier

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CSI Announces Paul Offit As Winner of the 2013 Balles Prize

Paul Fidalgo

Dr. Paul Offit is a lifesaver in the literal sense. His work in vaccinology and immunology, notably the invention of the rotavirus vaccine, has saved innumerable lives. But it is for a literary endeavor, perhaps no less valuable than his scientific work, that he is the 2013 recipient of the Robert P. Balles Annual Prize in Critical Thinking.

Offit is the author of *Do You Believe in Magic? The Sense and Nonsense of Alternative Medicine*, an indispensable book that boldly takes on the torrent of fantastical claims made by the alternative medicine industry—claims that rake in $34 billion a year for its promoters and put countless lives at risk. *Do You Believe in Magic?* examines, remedy by remedy, claim by claim, the real, provable effects and harms of a slew of alternative treatments and does so in a way that is entertaining, deeply informative, and emotionally compelling.

"Offit writes in a lucid and flowing style, and grounds a wealth of information within forceful and vivid narratives," writes Dr. Jerome Groopman, reviewing the book for *The New Republic*. "This makes his argument—that we should be guided by science—accessible to a wide audience." Dr. Harriet Hall, herself an invaluable skeptical activist and writer, raved in the pages of the Skeptical Inquirer that Offit "is a wonderful storyteller who makes his message come alive." *The Philadelphia Inquirer*'s Evi Heilbrunn wrote, "All who care about their health should read this book." We agree.

In his book, Offit is merciless in his application of scientific scrutiny to those who peddle false hope, yet never condescending to those who seek out these alternatives. *Do You Believe in Magic?*, as it disarms and deflates the alt-med industry's wild claims, most importantly empowers its readers with the information and critical perspective they'll need to make better decisions about their health and the health of their families.

As we said, Offit is a literal lifesaver. It is quite fitting, then, that the Committee for Skeptical Inquiry award the 2013 Robert P. Balles Prize to Offit for his book, which, as it educates the public about the dangers of alternative medicine, may save many, many more.

The Robert P. Balles Annual Prize in Critical Thinking is a $2,500 award given to the author of the published work that best exemplifies healthy skepticism, logical analysis, or empirical science. Each year, the Committee for Skeptical Inquiry, publisher of the Skeptical Inquirer, selects the paper, article, book, or other publication that has the greatest potential to create positive reader awareness of important scientific issues.

This prize has been established through the generosity of Robert P. Balles, an associate member of CSI and a practicing Christian, along with the Robert P. Balles Endowed Memorial Fund, a permanent endowment fund for the benefit of CSI. CSI's established criteria for the prize includes use of the most parsimonious theory to fit data or to explain apparently preternatural phenomena.

* * *

This is the ninth year the Robert P. Balles Prize has been presented. Previous winners of this award are:

- 2012: Steven Salzberg, for his "Fighting Pseudoscience" column in *Forbes*; and Joe Nickell, for his book *The Science of Ghosts—Searching for Spirits of the Dead*
- 2011: Richard Wiseman, psychologist and entertainer, for his book *Paranormality: Why We See What Isn't There*
- 2010: Steven Novella for his tremendous body of work, including the *Skeptics' Guide to the Universe*, *Science-Based Medicine*, *Neurologica*, Skeptical Inquirer column "The Science of Medicine," and his tireless travel and lecture schedule on behalf of skepticism
- 2009: Michael Specter, *New Yorker* staff writer and former foreign correspondent for *The New York Times*, for his book *Denialism: How Irrational Thinking Hinders Scientific Progress, Harms the Planet, and Threatens Our Lives*
- 2008: Leonard Mlodinow, physicist, author, and professor at Caltech, for his book *The Drunkard's Walk: How Randomness Rules Our Lives*
- 2007: Natalie Angier, *New York Times* science writer and author of the book *The Canon: A Whirligig Tour of the Beautiful Basics of Science*
- 2006: Ben Goldacre for his weekly column, "Bad Science," published in *The Guardian* newspaper (U.K.)
- 2005: Shared by Andrew Skolnick, Ray Hyman, and Joe Nickell for their series of articles in the Skeptical Inquirer on "Testing 'The Girl with X-Ray Eyes'"

Call for Nominations: There's amazing work being produced in 2014, with much more on the way. If you'd like to vouch for the author you think deserves the 2014 Balles Prize, contact Barry Karr at bkarr@centerforinquiry.net.

Paul Fidalgo is the communications director of the Center for Inquiry.

Discovery Institute Attack on *Cosmos* Provides a Teaching Moment of Its Own

Dave Thomas

Fox TV's Seth McFarlane has joined with astrophysicist Neil deGrasse Tyson and Ann Druyan, Carl Sagan's widow and collaborator, to continue Sagan's marvelous *Cosmos* series of decades ago. The new series is a splendid blend of homage to Sagan's original one with dazzling new graphics—and new discoveries.

The second episode of the series, first broadcast March 16, 2014, covered evolution and natural selection. (It can be viewed at http://www.cosmosontv.com/watch/195050051992.) As expected, creationists were furious. The main promoter of "intelligent design," Seattle's Discovery Institute, has run several anti-*Cosmos* blogs on its Evolution News and Views (ENV) website.

In their zeal to attack Tyson and the *Cosmos* series, however, the Discovery Institute has created a stunning example of the straw man logical fallacy. This fallacy is so named because it involves attacking one's opponent not by an honest dissection of his or her actual views but by attacking a caricature, a distorted *mis*representation of those views. The Discovery Institute's attack on the evolution episode of *Cosmos* was a particularly egregious example of this fallacy—a straw man for the ages, as it were.

The Institute's Casey Luskin dashed off a post on the morning after the second episode aired. The post was titled "*Cosmos* Episode 2: 'Mindless Evolution' Has All the Answers—If You Don't Think About It Too Deeply" (http://www.evolutionnews.org/2014/03/cosmos_episode_083331.html). Luskin quotes Tyson's comment comparing artificial to natural selection and proceeds to argue that Tyson believes that evolution can produce *anything:*

> Cosmos Episode 2 structures its argument much as Charles Darwin did in the *Origin of Species.* The opening scenes discuss how human breeders artificially selected many different dog breeds from wolf-like ancestors, including many popular breeds that "were created in only the last few centuries." The argument is simple—and it's the same one Darwin made: "If artificial selection can work such profound changes in only 10 to 15 thousand years, what can natural selection do operating over billions of years?" **The answer, I recall Tyson saying, is most "anything"** [emphasis added]. Just as he did in Episode 1, Tyson has overstated his case. The great evolutionary biologist Ernst Mayr explains precisely why Tyson is wrong:
>
> "Some enthusiasts have claimed that natural selection can do **anything. This is not true** [emphasis in original]. Even though 'natural selection is daily and hourly scrutinizing, throughout the world, every variation even the slightest,' as Darwin (1859:84) has stated, it is nevertheless evident that there are definite limits to the effectiveness of selection". . . .

If Tyson had indeed said that natural selection can do *anything*, Luskin would have been entirely correct to point out that the claim has been thoroughly refuted by mainstream biologists such as Mayr. The problem is that Tyson said nothing of the sort.

Here's what Tyson *really* said about what "natural selection can do operating over billions of years":

> The answer is: all the beauty and diversity of life.

In other words, Tyson was saying that selection plus mutation explains the stunning diversity of life on our planet—warts and all. He *never* said that natural selection can do *anything*, and later in the episode he gave a great example of how selection plus mutation is strongly *limited* by historic contingency. In a lengthy segment on the evolution of complex structures such as eyes, about thirty minutes later in the episode, Tyson points out that eyes evolved under water and that fish have exquisite vision. This allows them to focus on things right in front of their faces and in dim light, unlike land animals (including humans). Because of refraction, however, our wet eyes distort light from the dry air, and we've never quite recovered from losing our ideal aquatic vision. As Tyson said:

> When we left the water, why didn't nature just "start over again," and evolve us a new set of eyes that were optimal for seeing in the air? Nature doesn't work that way. Evolution

> reshapes existing structures over generations, adapting them with small changes. *It can't just go back to the drawing board and start from scratch*.

Of course, that's not even remotely like Luskin's ludicrous accusation that Tyson thinks natural selection over time can do "most anything." The same morning it appeared, someone persuaded Luskin to correct the words he'd put into Tyson's mouth, but Luskin added new verbiage just after that to further his still-false claim that Tyson actually *does* believe that natural selection can do "most anything." The revised comment by Luskin now reads

> **The answer, Tyson tells us, is "all the beauty and diversity of life." In other words, Tyson wants you to believe that natural selection provides all the answers for everything since life arose** [emphasis added]. Just as he did in Episode 1, Tyson has overstated his case. . . .

In both versions of his post (pre- and post-correction), Luskin vigorously repeated his colossal straw man argument: **"Tyson's main argument that selection and mutation can evolve anything** [emphasis added] focuses on the evolution of the eye. Here, he attacks intelligent design by name. . . ."

In addition to a spectacular example of the straw man fallacy, the affair provides insight into the dangers of pseudoscience. If only Luskin had decided to simply watch the show and give Tyson a chance to explain the case for evolution, he would never have made such a serious error. Instead, Luskin had no time for actual comprehension of what was being said; he was far too busy looking for talking points on which to condemn Tyson, *Cosmos*, and evolution. Luskin was so busy constructing his hit piece he wasn't even aware that Tyson was vigorously agreeing with Mayr: evolution can't do just *anything*. It's a perfect illustration of the mindset of a pseudoscientist.

Dave Thomas, a physicist and mathematician, is president of New Mexicans for Science and Reason and a Fellow of the Committee for Skeptical Inquiry. He is currently a scientist/programmer at IRIS/PASSCAL in Socorro, New Mexico, and also teaches classes in physics, psychology, and critical thinking at New Mexico Tech. He is a recipient of the National Center for Science Education's Friend of Darwin Award.

Experts to FDA: Protect Cancer Patients from Burzynski's False Cures

A coalition of physicians, medical officials, scientists, and public policy experts have joined the Center for Inquiry in expressing to the Food and Drug Administration (FDA) their deep concern over its recent decision to allow cancer patients access to unapproved drugs provided by Dr. Stanislaw Burzynski.

The FDA recently announced it would allow single-patient Investigational New Drug (IND) applications for some patients to be treated with Burzynski's drugs, called "antineoplastons."

CFI's April 16 letter to FDA commissioner Margaret A. Hamburg points out that over the course of four decades, Burzynski has promoted and administered unproven, almost certainly ineffective, and toxic treatments to cancer patients. He has claimed for more than thirty-six years that the use of his drugs, "antineoplastons" (ANPs), results in substantially better outcomes than the current standard of evidence-based care for malignant brain tumors. He has even claimed to be able to cure irremovable brain-stem tumors—despite the total lack of reliable evidence to support his claims.

Burzynski's treatments were examined in depth in the March/April 2014 issue of the Skeptical Inquirer, published by CFI's Committee for Skeptical Inquiry. David H. Gorski, MD, PhD, analyzed the history of Burzynski's claims and made it starkly clear that no scientific evidence exists to support his treatments.

Gorski and numerous other medical experts have found that Burzynski has been allowed to continue to deceive desperate people into thinking they should eschew proven medical treatments in favor of his clinical trials. The result, says the CFI letter, is "ongoing, incalculable harm brought upon individuals and families at their most vulnerable moments."

The CFI letter concludes:

> The FDA has an obligation to minimize the damage being done by purveyors of false medical treatments who harm others, such as Dr. Burzynski. That is why we now urge you to move to immediately end Dr. Burzynski's clinical trials of ANPs, rescind his status as a medical researcher, and, in concert with the HHS Office of Human Research Protection under whose jurisdiction it falls, close his Institutional Review Board permanently. We also urge you to make clear to Dr. Burzynski's patients, and the general public, that the agency is taking these measures because of the lack of scientifically reliable evidence to support Burzynski's claims regarding the efficacy of antineoplastons, and his long record of non-compliance with regulations designed to protect human research subjects.

The letter, which can be read in full at http://www.centerforinquiry.net/docs/opp/FDA_letter.pdf, has been signed by more than a dozen experts.

Journal's Withdrawal of 'Recursive Fury' Paper Ignites New Controversy about Climate Denialist Tactics

Kendrick Frazier

A psychology journal's withdrawal of a controversial paper by scientists studying climate-change denialism has ignited still another controversy and led to several of the journal's editors resigning.

The paper, "Recursive Fury: Conspiracist Ideation in the Blogosphere in Response to Research on Conspiricist Ideation," was accepted in February 2013 by *Frontiers in Psychology*, an open-source journal published in Switzerland. Its authors, psychologist Stephan Lewandowsky of the University of Western Australia (now of the University of Bristol, United Kingdom) and three others, systematically analyzed responses to an earlier published paper of Lewandowsky's concluding that conspiracist thinking was associated with the rejection of climate science and other scientific propositions, such as the connections between HIV and AIDS and between smoking and lung cancer.

The "Recursive Fury" paper showed that many of the responses in the blogosphere exhibited conspiratorial content and counterfactual thinking. Some of the discussion ultimately grew in scope to include actors beyond the authors of the original paper, such as university executives, a media organization, and the Australian government. The paper concluded that the overall pattern of the blogosphere's response illustrates a possible role of conspiracist ideation in the rejection of science.

Conspiracist thinking was associated with the rejection of climate science and other scientific propositions.

The Skeptical Inquirer wrote about the authors' two papers in a News and Comment article last year ("Psychologists' Paper on Conspiracist Thinking Stimulates More of It," May/June 2013).

Critics of Lewandowsky's papers immediately launched a campaign of attacks directed at *Frontiers in Psychology*. Some contended they had been personally attacked and even libeled. Others characterized the second paper as a "revenge" paper. The journal investigated for a year, and on March 14, 2014, it withdrew the paper, not for lack of merit but due to what it called the "legal context." This is the key paragraph of its retraction statement:

Royal Society, National Academy of Sciences Issue Joint Report on Climate Change

The Royal Society (U.K.) and the U.S. National Academy of Sciences (NAS), two of the world's most distinguished scientific organizations, have joined forces to issue a short guide to the evidence for climate change.

Climate Change: Evidence & Causes is available to the public online at http://www.nap.edu/openbook.php?record_id=18730.

The illustrated thirty-page color publication is an accessible reference for the public and policy makers.

Calling climate change one of the defining issues of our time, NAS President Ralph J. Cicerone and Royal Society President Sir Paul Nurse say in the preface: "It is now more certain than ever, based on many lines of evidence, that humans are changing climate. The atmosphere and oceans have warmed, accompanied by a sea-level rise, a strong decline in Arctic sea ice, and other climate-related changes. . . . However, due to the nature of science, not every single detail is totally settled or completely certain. . . ."

They note that the two organizations have similar missions to promote the use of science to benefit society and to inform critical policy debate. They offer the new booklet as "a key reference document for decision makers, policy makers, educators, and other individuals seeking authoritative answers about the current state of climate-change science. The publication makes clear what is well established, where the consensus is growing, and where there is still uncertainty."

Here are a few of the questions succinctly answered: "How do scientists know that recent climate change is largely caused by human activities?" "Is the current level of atmospheric CO_2 concentration unprecedented in Earth's history?" "Does the recent slowdown of warming mean that climate change is no longer happening?" And "Are climate changes of a few degrees a cause for concern?"

The report was written and reviewed by a U.K.–U.S. team of leading climate scientists. Both the NAS and the Royal Society have previously issued their own reports about climate science, but this is the first joint publication.

> In the light of a small number of complaints received following publication of the original research article cited above, *Frontiers* carried out a detailed investigation of the academic, ethical, and legal aspects of the work. This investigation did not identify any issues with the academic and ethical aspects of the study. It did, however, determine that the legal context is insufficiently clear and therefore *Frontiers* wishes to retract the published article. The authors understand this decision, while they stand by their article and regret the limitations on academic freedom which can be caused by legal factors.

In other words, the academic and ethical complaints were found unjustified, but the journal still feared the legal threats against it. The notoriously strict English libel laws seem to be at the root of the fears, but these laws have since been liberalized.

The academic and ethical complaints were found unjustified, but the journal still feared the legal threats against it.

Scientists are concerned that this is an example of intimidation tactics by climate deniers to stifle scientific publication. One of the paper's peer-reviewers, Elaine McKewon of the Australian Center for Independent Journalism (University of Technology, Sydney), said she was "profoundly disappointed by the retraction," and she shared much of the inside story in several posts. She called the paper "theoretically strong, methodologically sound" and said its conclusions were "based on clear evidence." After the legal threats, she and other colleagues had argued that "scientific journals must not be held to ransom every time someone threatens litigation . . . I would have expected a scientific journal to have more backbone, certainly when it comes to the crucially important issue of academic freedom."

The journal subsequently said it had received criticisms of the paper but not "threats," a claim McKewon and even Lewandowsky himself rebut. In a statement posted April 7, Lewandowsky referred to *Frontiers*'s two statements regarding the retraction as "contradictory" and expressed puzzlement over the real reason for it.

Some comments by *Frontiers*'s editor-in-chief, Henry Markram, led to one of his potential associate editors writing, "I see this behavior from *Frontiers* as counterproductive to science in general and climate science in particular. . . . I can't see how it [the journal] can be supported by the research community."

The full controversy is too involved to fully portray in this space, but here are several key documents that provide much more detail:

'Recurrent Fury' References (Following Retraction), http://www.skepticalscience.com/republishers.php?a=recurrentfury.

Understanding Climate Risk: Frontiers retraction controversy, http://2risk.wordpress.com/2014/04/17/frontiers-retraction-controversy/.

Elaine McKewon, The Journal that Gave In to Climate Deniers' Intimidation, http://www.yaleclimatemediaforum.org/2014/04/the-journal-that-gave-in-to-climate-deniers-intimidation/.

Elaine McKewon, Editors Resign as Retraction Scandal Deepens at Science Journal That Caved in to Intimidation from Climate Deniers, http://www.huffingtonpost.com/elaine-mckewon/why-this-is-a-dark-time-for-the-field-of-climate-science_b_5174083.html?utm_hp_ref=green&ir=Green.

Stephan Lewandowsky, Revisiting a retraction, http://www.shapingtomorrowsworld.org/rf3.html.

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Naturopathy Gains Legitimacy in Canada's Largest Province

Nicholas Robinson

Canada's largest province is on the verge of granting naturopathic practitioners the right to prescribe several drugs and order laboratory tests. The Ontario College of Naturopaths has set up a council for the purpose of drafting regulations under the terms of the Naturopathy Act of 2007 (http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_07n10_e.htm). British Columbia instituted similar laws several years ago. The recognition of naturopathy by the provinces of Ontario and British Columbia is part of a growing trend of governments institutionalizing alternative medicine. Proponents of the move say that given that many people already use alternative medicine, giving practitioners expanded powers will help make health care more efficient and less expensive.

Naturopathy is a form of alternative medicine that uses only natural remedies and avoids conventional treatments, such as pharmaceutical drugs and surgery. Naturopaths believe that the body has the ability to heal itself as long as the environment is healthy. To ensure the health of the patient, naturopaths will use therapies such as dietary supplements, meditation, acupuncture, dietary advice, herbal medicine, and homeopathy. Twenty-two provinces and American states, such as Alberta, Arizona, British Columbia, California, and Oregon, recognize naturopaths and allow self-regulation for naturopathic doctors.

The growing recognition of naturopathy has been met with alarm by several groups such as the Ontario Medical Association, which represents thousands of doctors in Ontario. Naturopathy is criticized for being pseudoscientific, with many of its treatments having no good evidence to support effectiveness and several treatments being potentially dangerous, such as some herbal medicines and vitamin supplements. Also, alternative medicine practitioners sometimes advise against proven medical practices such as vaccines.

The rise of alternative medicine recognition by governments is dubious. Alternative medicine is not only generally useless, it can actually be dangerous. Governments should follow the evidence and listen to the experts. That means not promoting unproven and ineffective medical therapies.

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[INVESTIGATIVE FILES JOE NICKELL

Joe Nickell is CSI's senior research fellow. A former stage magician, private investigator, scholar (PhD in English, with an emphasis on literary investigation and folklore), and forensic writer, he is the author of numerous books, including *The Science of Miracles* (2013).

The 'Miracles' of Father Baker

The late Western New York priest, the revered Father Nelson Baker (1841–1936), devoted himself to Catholic works, including replacing a fire-damaged church with an impressive basilica and creating a hospital, a boys' orphanage, a boys' protectory, and other institutions. My collection of Father Baker memorabilia (Figure 1) includes a set of old newspapers that range over a several-day period in 1936 with full-page spreads telling of his death (July 29), the viewing of his body, and his funeral and burial. Crowds swelled, and the faithful vied to touch the dead monsignor's ring or to press against it "holy relics" they brought (Thousands 1936). As one news article explained, "This, in the tradition of the Church, is tantamount to a blessing bestowed by a living divine" (Father Baker 1936). An honor guard around the open coffin, which lay in state in the basilica, kept a watchful eye as some attempted to snip a lock of his hair or cut a piece of his vestment for a "relic" of the envisioned future saint (Anderson 2002, 113).

Since then, parishioners of the city of Lackawanna, New York, where Baker's Our Lady of Victory Basilica stands, have advanced the "cause" of elevating him to sainthood, and formal efforts began in 1987. To facilitate this possibility, in 1999 Baker's body was disinterred from the Holy Cross Cemetery near the basilica and transferred to a crypt inside the basilica itself. In

2011, the Church officially elevated Baker to "venerable" status, the first of three steps to sainthood. Now, two miracles are needed to complete the process—leading first to beatification, then to canonization (Tokasz 2013). Here we look at a few of the unusual incidents that some have called "miraculous," although none has been accepted as such by the Catholic Church.

The Eyes of Beholders

Science has never authenticated a single miracle. Miracle claims, in fact, are invariably based on a logical fallacy called "arguing from ignorance"—that is, drawing a conclusion from a lack of knowledge. Take "miraculous" healings for example. Insisting that a given case is medically inexplicable does not constitute proof that a miracle occurred. Some illnesses are known to exhibit spontaneous remission, while other reputed cures may be due to misdiagnosis, psychosomatic conditions, the body's own natural healing ability, and other factors, including the delayed benefits of previous medical treatment (Nickell 2013, 183–184).

Among the numerous supposedly miraculous healings attributed to Baker are several that involve eye conditions. In a case reported in 1948, for example, a malfunctioning machine caused a piece of metal to lodge in a worker's eye. While one specialist reportedly recommended the eye's removal, the victim and his wife chose instead to chance surgery, and this was a success in that the patient regained some sight (Koerner 2005, 44–45). But this can hardly be called a miracle, even a partial one, and is instead a lesson about assessing risk and getting a second opinion.

In 1950, a Kansas man received an injury to both eyes, and, we are told, "The doctors gave no hope for the eye or the sight in the other eye either." Now, such no-hope-from-doctors claims are almost obligatory in miracle tales, but

we usually hear this at second hand, not from the doctors themselves. In any case, doctors may be mistaken. So when we learn the man did not lose his eye and regained all but 10 percent of his sight, do we really have a miracle—the man's wife linking the success to her having invoked Baker (Koerner 2005, 45)—or is this simply another case (such as the previous one) in which someone credits a superstitious practice rather than skilled medical performance?

In still another case, in 1953 a Wisconsin boy's homemade bomb exploded, seriously damaging his eye. At first, the doctors held out little hope and asked permission to remove the eye. However, during another examination prior to surgery, the boy reported some sight, and his vision then steadily improved. Because the boy's mother had prayed to the Virgin Mary and Father Baker, she credited them with a miracle (Koerner 2005, 45–46), rather than acknowledging that her son's condition was not as bad as it had appeared and that his body's own natural healing mechanisms were activated.

Such reports betray the claimants' eagerness to believe that science is trumped by the supernatural, no matter the actual facts. Their spin that Baker was somehow involved in their cases—say as an unaware intercessor—is ironic in light of his own situation. For Nelson Baker—having had some trauma in his own right eye—suffered for approximately his last decade with just half his vision, indeed *having a glass eye* (Koerner 2005, 47). The old proverb (recalled in Luke 4:23) comes to mind: "Physician, heal thyself."

The Still-Liquid Blood

When Baker's coffin was unearthed in 1999 for reinterment in the basilica (where it would be more accessible for people to venerate the priest and so further the canonization campaign), something remarkable occurred. Discovered in a small vault resting on the coffin were three vials of his blood that had been obtained at the time his body was embalmed. The purpose behind this is unknown, but, as it turned out, the blood was surprisingly still liquid. Was this a miracle, as some were quick to claim? (In Catholicism, evidence of "incorruptibility" of bodies was touted over the centuries, but modern investigations have revealed proof of corpses' embalming, repair, faces covered with wax masks, and other explanations [Nickell 2013, 169–172]).

The opinions of several pathologists were sought, and I followed the issue with interest—visiting the old grave site and the new crypt in the basilica (which now has a museum to Baker in its basement), talking with various persons, including one of the consulted pathologists, and doing additional research, even conducting experiments in my paranormal lab at the Center for Inquiry. I wrote a letter, cosigned by Paul Kurtz (CSI founder) and Barry Karr (executive director), to the then Bishop of Buffalo, Henry J. Mansell, asking for information on tests of the blood. Mansell (2000) replied that "The tests, affidavits, and testimony in the cause of Father Baker are all confidential as the case goes forward, so I am not at liberty to share the documentation with you." It was the kind of noncooperation in such matters with Catholic authorities (e.g., the Shroud of Turin) that I was used to.

In my forensic and related inquiries, I learned that it is not without precedent for what has been removed from a body to be buried with it. It happens at autopsy, for example (Loghmanee 2007). However, the Baker blood vials seem different in their selectivity and special presentation.[1] There are a number of hypotheses to explain how blood might remain liquid for over sixty years. "If the vial is sealed," reported Dr. Ken Blumenthal (2003), who chairs the Department of Biochemistry at the State University of New York at Buffalo's School of Medicine and Biomedical Sciences, "there's no reason to expect it to have evaporated." And if the vial "was sterile to begin with, and was filled with no air left inside, the sample could very well remain intact indefinitely."

Dr. John Wright (2003), a professor of pathology and anatomical sciences at the same university, offered a similar opinion and added: "I presume Father Baker was not anti-coagulated pre-mortem but he could have died with disseminated intravascular coagulation (DIC) syndrome (a common mode of death), and used up all of the coagulants that would normally make blood clot. There are probably a host of other possible explanations, however."

Among other possibilities is that some preservative may have been added to the blood, which, after all, had obviously been intended to be preserved. In one discussion, the suggestion was made that the blood, if taken from that

A small portion of the author's collection of Father Baker memorabilia: an old postcard of Our Lady of Victory Basilica, a statuette, and a bottle of holy water from the basilica. (Photo by Joe Nickell)

forced out of the body by the embalming fluid, might have contained some of the latter. However, most embalming fluid contains some formaldehyde, which—as my own experiments show—has the effect of thickening or even solidifying the blood rather than keeping it liquid.[2] Still, there are various solutions that can both preserve and prevent the coagulation of whole blood, if the blood were removed so that formaldehyde-containing embalming fluid was not present (Bloodindex 2013).

Whatever the actual facts, however, the church has not accepted that the blood's having remained liquid is evidence a miracle occurred. As a rule of thumb in such matters, I try never to be less skeptical than the Catholic Church.

Miraculous Awakening?

At 6:54 AM, December 29, 1995, the roof of a burning house collapsed on Buffalo fireman Donald J. Herbert. Before being rescued, he had been starved of oxygen for some six minutes, resulting in brain damage. For almost the next decade, he was in a minimally responsive state, unable to communicate effectively.

Then, suddenly, on April 30, 2005, while sitting in his wheelchair in Father Baker Manor, a nursing home in Orchard Park, New York, Herbert began calling aloud for his wife, Linda, and four sons. He was soon talking and recognizing family, friends, and fellow firefighters. The change in his condition was remarkable (Lakamp 2013).

Many called it a miracle. One of his physicians at Father Baker Manor thought so, saying at a press conference, "I can't explain it any other way. It's phenomenal." Indeed, some thought it was just the case they were looking for to spark the canonization of the priest the rest home was named for. They believed the Herbert case could well be one of the two requisite miracles needed to declare Baker a saint. Soon, however, such hopes were all but dashed. Herbert's "recovery"—already limited—was uneven, and it suffered a decline after a nighttime fall from bed sent him to a hospital emergency room for stiches to his head. He died February 22, 2006, eight months after his awakening (Koerner 2009, 44–47; Lakamp 2013).

Herbert's unusual case did not seem to meet the requirements for canonization. The Vatican requires such a miracle not only to be medically inexplicable but also complete and permanent—Herbert's was neither—and for the candidate for sainthood to have interceded. The latter act could not be effectively established, since Linda Herbert had prayed not only to Father Baker but also "to every saint and holy figure on record" (Blake 2007, 235). So to whom should the supposed intercession be attributed?

In fact, Donald Herbert's wonderful improvement—limited and temporary though it proved to be—was apparently due to science. About three months before, Herbert's physician, Dr. Jamil Ahmed of the University at Buffalo, had prescribed a "cocktail" of medications for Herbert. The drugs targeted chemicals in the brain such as serotonin, dopamine, and norepinephrine to treat problems of attention, cognition, and so on. (See Hitti 2005).

Monsignor Robert Wurtz, a pastor involved in the crusade to canonize Father Baker, reportedly credited Herbert's improvement to the drug cocktail rather than to Baker's intercession. This effectively eliminated the Herbert case from consideration as a miracle (Blake 2007, 243; Koerner 2009, 47).

It should be emphasized that the Herbert case is unlike another high-profile one—that of Terry Schiavo, who was in a persistent vegetative state and so had her life ended by the removal of her feeding tube. Herbert's situation was such that he was severely disabled but apparently minimally conscious—not vegetative (Hitti 2005).

* * *

As these several examples make clear, claims of miracles attributed to Father Nelson Baker seem endless but are, at best, only examples of the logical fallacy called arguing from ignorance. As I stated in a letter to *The Buffalo News* (Nickell 2011) ". . . Not only is such an argument unscientific in its implication. It's obviously meant to keep science in a position subservient to the supernatural, when in fact there is no credible evidence for other than a real, natural world. If the Church wishes to honor Baker for his public service, it should by all means do so. But let there be an end to the miracles game." ■

Acknowledgments

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Notes

1. The jars were "enclosed in a leather case and then placed in a conolite box on top of Baker's steel coffin" (Koerner 2005, 66).

2. I used formalin (diluted formaldehyde) and the anti-liquid effect was still profound.

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[THINKING ABOUT SCIENCE MASSIMO PIGLIUCCI

Massimo Pigliucci is professor of philosophy at the City University of New York, a Fellow of the American Association for the Advancement of Science, and coeditor (with Maarten Boudry) most recently of *Philosophy of Pseudoscience: Reconsidering the Demarcation Problem.* His essays can be found at rationallyspeaking.org.

The Epistemology of Thought Experiments, Part 2

In my previous column (Part 1, May/June 2014) we began to examine the nature of thought experiments, a peculiar type of reasoning used in both science and philosophy (just think of Galileo's demonstration that Aristotelian physics implies a logical contradiction, or of Einstein's famous thought experiment about chasing a beam of light, which led to the Special Theory of Relativity).

We have been approaching the problem of how to make sense of thought experiments by way of a very nice paper published by Hayley Clatterbuck in the *European Journal of Philosophy of Science* (online on June 14, 2013). We have seen that the author considers three possible explanations for how thought experiments work: they may represent an example of Platonic knowledge; they may be a pictorial form of standard inductive arguments; or they may represent a special type of induction. We have examined the first possibility and found it both intriguing and unlikely. Time now to turn to the other two options.

The idea that thought experiments are nothing but standard arguments accompanied by pictures has been defended, for instance, by philosopher John Norton. According to Norton, what Galileo, Einstein, and others have been doing is simply presenting an inductive or deductive argument, peppered with pictures to make it more vivid to the intended audience. The point being that the "pictures" (Galileo's two bodies of different weight falling separately or linked to each other; Einstein's beams of light) are not necessary for the argument to go through; they are just embellishments with rhetorical but not epistemic force. Essentially, Norton is being parsimonious here: if we assume that thought experiments are just standard arguments plus pictures (where the latter play no novel epistemic role), then we don't need to invoke Platonism.

In a sense—when done well—thought experiments are more powerful than standard enumerative induction, which after all is based on always-fallible collections of observations.

But Clatterbuck thinks that Norton is being *too* parsimonious, missing an important part of the action. To understand her point, we need to remember that there is more than one kind of inductive argument that people can pursue. Induction, of course, is a generalization from a small number of examples to a broader class, and it represents a fundamental way in which we advance scientific knowledge (as well as everyday knowledge, for that matter). A common type of induction is called *enumerative induction*, and it works like this: I observe a given phenomenon X number of times, and the more I observe it, the more I can be confident that it will happen again under similar circumstances. For instance, I have seen the sun rise hundreds of times before in my life, so by enumerative induction I can be quite confident that it will do so again tomorrow. (Notice that the reasoning is quite independent of any knowledge about the causes of the phenomenon, in this case the daily rotation of Earth around its axis.)

But one can do induction in a quite different (and equally logically valid) way too. We can, for instance, imagine a given situation (say, the fall of two bodies of different weight, either linked to each other or not); we can then abstract away all irrelevant or distracting factors (e.g., imagine that there is no air friction to interfere with the situation); arrive at certain conclusions concerning the imagined situation (in this case, that Aristotelian physics applied to the hypothetical experiment leads to a logical contradiction); and finally generalize our findings to the real (i.e., not idealized) world. What we have as a result, of course, is a thought experiment. But notice that the *idealization* of the circumstances played a crucial role in the construction of the experiment. That is, according to Clatterbuck, the "picture" part of the inductive reasoning we just deployed is not simply a pretty accessory; it is a crucial aspect of what's going on. The result is something dif-

ferent from enumerative induction, since we don't have to "observe" more than one case to infer our conclusions: the (idealized) case is sufficient by itself to yield a logically valid inference!

The upshot is that thought experiments indeed embody a type of inductive reasoning, but that such reasoning *requires* idealization or abstraction to yield the conclusion from a single instance to a generally valid class of cases. In a sense—when done well—thought experiments are more powerful than standard enumerative induction, which after all is based on always-fallible collections of observations.

What use is any of this to the skeptic (other than learning something about reasoning tools, which after all are what skepticism is all about)? Well, for instance we could construct a thought experiment that strongly argues against the coherence of out-of-body experiences. We can begin by assuming that *if* we were really experiencing the world from outside our bodies, *then* there is no reason to expect that we should be constrained by the physical limitations of said bodies. In particular, vision ordinarily depends on having a proper physiological apparatus, including functional eyes of a certain shape, appropriate pigments, optical nerve, and of course a complex set of brain regions apt to interpret visual information. But *if* we are "seeing" things without aid of eyes, optical nerve, and brain, *then* we ought to be able to see with an unlimited field of view (360 degrees) and without restrictions of wavelength (i.e., perceiving not just "visible" light). Since people who claim to have had out of body experiences do not report these or any other differences in the way they perceived the world during the alleged paranormal event, we can conclude that they did not actually have an out of body experience.

Of course, my little thought experiment isn't likely to convince the paranormalist (but is anything, really?). And it—like all thought experiments—can be challenged by rejecting the validity of one or more of its assumptions. But notice that the challenge carries consequences: if, for instance, the paranormalist claims that under those conditions we still retain the characteristics of normal "vision," he then owes us an account of how, exactly, that is possible or, which is the same, of why our assumptions about a less constrained sensorial experience do not hold. Something tells me that such an account would not be forthcoming and that what we would get instead is some degree of more or less frantic hand waving. ■

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Sharon Hill's "Sounds Sciencey" column looks at the guys behind the *Strange Frequencies Radio* podcast and their journey from believers to skeptics.

For more online columns, features, and special content, visit **www.csicop.org.**

Sheaffer's "Psychic Vibrations" column has appeared in the SKEPTICAL INQUIRER for more than thirty years; its highlights have now been published as a book (Create Space, 2011). Sheaffer blogs at www.BadUFOs.com, and his website is www.debunker.com.

MUFON Jumps the Shark

From the UrbanDictionary.com:

> *To jump the shark*: The precise moment when you know a program, band, actor, politician, or other public figure has taken a turn for the worse, gone downhill, become irreversibly bad, is unredeemable, etc.; the moment you realize decay has set in.

MUFON (Mutual UFO Network), the largest UFO organization in the United States, presents itself as being dedicated to the scientific investigation of UFOs. Its website describes "MUFON's Use of the Scientific Method":

> In the reporting and investigation of UFO sightings, MUFON strives to use the scientific method.... In order to augment scientific research into the study of the UFO phenomenon, MUFON created a Science Review Board (SRB) in 2012. The SRB consists of 8-9 scientists with backgrounds in electrical engineering, physics, chemistry, geology, biology, computer science, and astronomy.

MUFON has just debuted a television series on the cable channel H2 (History Channel #2, placing it in the august company of shows such as *Ancient Aliens* and *The UFO Hunters*). In it, the scientific method is nowhere to be seen. The series is called *Hangar 1 the UFO Files*, where "Hangar 1" is supposed to be the place MUFON's supposedly vast collection of UFO data (or UFO stories) is kept. Since MUFON does not exactly own buildings or anything, and its headquarters keeps moving as its directors change, some folks doubt that there even is such a place as "Hangar 1" (think of that huge storage building at the end of *Raiders of the Lost Ark*). MUFON people reply that there is (or was) indeed a Hangar 1. It is the property of MUFON's former director, David MacDonald, who is in the civil aviation business near Cincinnati. So if MacDonald wheeled a couple of file cabinets into his airplane hangar, the claim is (or was) technically correct—but still misleading. When Jan C. Harzan became MUFON's director in 2013, MUFON's headquarters moved to his hometown of Newport Beach, California. No word on whether Harzan procured a new airplane hangar for all those files.

And what exactly does MUFON serve up from its precious archives? Some of the most preposterous, sensationalized, and unsubstantiated stories in the UFO literature. President Dwight Eisenhower interrupted a golf trip to Palm Springs, California, in 1954 to dash off to Edwards Air Force Base for a meeting with extraterrestrials. President Richard Nixon stopped by, alone and unannounced,

one midnight at the Florida house of his friend Jackie Gleason. The two of them drove, unescorted, to Homestead Air Force Base to view the bodies of dead aliens.

Actor Dwight Equitz is presented as a fake "UFO researcher" who scrambles up facts about the Roswell "UFO crash." Blogger Jason Colavito showed that MUFON took a quote from one of Stanton Friedman's books and fabricated a document from it to make it look like a genuine secret government UFO document (http://goo.gl/DhS2P1). *Hangar 1* presented this as if it were authentic, with no explanation or disclaimer. If that isn't downright dishonesty, I don't know what else to call it.

In a sense, this is nothing new. When the notorious Gulf Breeze UFO hoax photos first surfaced in 1987, MUFON's Director Walt Andrus embraced them wholeheartedly, resulting in the resignation of some of MUFON's best-known investigators. Andrus was so protective of that hoax that when some of MUFON's most respected investigators checked it out firsthand and declared it a hoax, Andrus's reaction was to fire the investigators and perpetuate the hoax (this column, Summer 1991; more in my book *Psychic Vibrations*, http://goo.gl/v0OK54). And the reason was obvious: these dramatic but hokey photos were enormously popular with MUFON's subscribers, who wanted to see more "red meat" in UFOlogy. Propelled by the momentum of the Gulf Breeze hoax, MUFON grew significantly.

Unfortunately, given the success of such trashy cable TV shows as *Ancient Aliens*, *Hangar 1* probably will be a commercial success. It gives viewers what they want: exciting stories about alien encounters that sound credible because they are presented in an extremely biased and inaccurate way. And it probably will be successful in bringing new members to MUFON, so look for plenty more such absurdities to follow. More cautious organizations, for example MUFON under James Carrion, do not excite and retain their followers nearly as well and tend to lose membership. The members don't want to hear about caveats and uncertainty. But when an organization follows the spotlight and ignores proper skepticism, it defines itself as a fringe, "crackpot" organization and is laughed at by anyone who understands science.

What is really interesting is that the people who seem to be the most upset about the absurdities of *Hangar 1* are not skeptics, who expect pro-UFO organizations to act irresponsibly, but instead those I call "skeptical believers": those who believe that some UFO incidents might represent genuine mysteries beyond science but who recognize that the great bulk of UFOlogy consists of error, exaggeration, and humbug. And the "skeptical believer" is just as ready to denounce humbugs as is any skeptic. After all, the only way to convince science that the UFO phenomenon is worth studying would be to toss aside all of the accumulated humbugs and accentuate the (hopefully) solid cases. So when MUFON gives itself over to humbug without reservation, it destroys all hope of presenting a convincing pro-UFO case to the skeptical scientific world. So much for the "scientific method"! In a very real sense, the skeptical believers, along with skeptics, are allies who can be characterized as realists—those who care very much what the facts are about UFO cases and try to stick to the facts as best as possible—as opposed to unrealists who are ready to embrace any absurd UFO tale if it is exciting and ignore all facts to the contrary.

There are still some fine investigators in MUFON, who do not make claims beyond what the data will allow and who are ready to denounce hoaxes and humbugs wherever encountered. People like these cannot possibly be happy about MUFON's plunge into tabloid sensationalism and can scarcely afford to have their names associated with such trash.

And finally, we learn from John Ventre, a MUFON state director and one of the "stars" of *Hangar 1*, that the missing Malaysia Airlines Flight 370 was abducted by extraterrestrials (http://goo.gl/zhgnha). What is MUFON coming to?

* * *

In my "Psychic Vibrations" column, January/February 2013, I wrote about an uncritical pro-UFO panel sponsored by the Smithsonian-affiliated National Atomic Testing Museum in Las Vegas that promised UFO "secrets" revealed. One would hope that in that intervening time things would have gotten better, owing to the bad publicity they received over this. Unfortunately, things seem to be getting worse.

I was at the recent International UFO Congress near Phoenix, Arizona, and so was the National Atomic Testing Museum of Las Vegas and its director, Allan Palmer. In the dealers' room, nestled in with the Adamski Foundation and other New Age and UFO organizations, the museum set up a table to promote itself to the UFO aficionados. Among their offerings was a discount coupon, exclusively to attendees of the UFO Congress, for entry into their exhibit on Area 51, which presumably still includes an

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"authentic alien artifact" from Russia given to it by George Knapp, a frequent guest host of the all-night paranormal and conspiracy radio program *Coast to Coast AM*. As I wrote in the referenced "Psychic Vibrations" column:

> During the question and answer session, Las Vegas skeptic John Whiteside asked about the supposed "authentic alien artifact" in the Area 51 exhibit. The moderator referred the question to reporter George Knapp, in the audience, who (scandalously) was the source of that "artifact." Knapp has made a career out of reporting on weird stuff like alleged saucers at Area 51, Robert Bigelow's Haunted Ranch in Utah, etc. Who had verified that supposed artifact? The Russians and others. Who exactly? No answer.

At the UFO conference, I had the opportunity to meet the executive director and CEO of the museum, Allan Palmer. He is a personable sort of fellow and, I thought, much more of a showman than an educator. (Earlier, when he was the head of the San Diego Air and Space Museum, he brought in the exhibit "The Science of Aliens.") I thought that perhaps he might be upset concerning what I had written earlier about his museum, but that did not seem to be the case. As we mentioned last year's controversial panel of pro-UFOlogists who presented dubious UFO claims at his museum, Palmer explained the difficulties he had with the Smithsonian over his museum's use of the tag "Smithsonian-affiliated." They didn't like his use of that label when the subject matter was UFOs. (Fellow UFO skeptic James McGaha tells me it was him who called up the Smithsonian to complain about the museum's UFO presentation.)

But, Palmer replied to them, you have presented a program on UFOs yourself! And he reminded them that on September 6, 1980, the Smithsonian Institution sponsored a half-day UFO Symposium in Washington, D.C. It was held in the large lecture hall of the Museum of Natural History. Six leading UFOlogists, pro and con, were invited to participate. On the "pro" side were the late J. Allen Hynek, Allan Hendry (who at that time was The Center for UFO Studies' chief investigator), and Bruce Maccabee. On the skeptical side were the late Philip J. Klass, James E. Oberg, and myself. (If you're going to have a panel to discuss UFOs, that is the way to do it! The UFO Panel at Palmer's museum consisted solely of UFO proponents.) We each gave our presentations and took questions in writing from the audience. My presentation is online at http://www.debunker.com/historical/SmithsonianUFOtalk.html. One member of the audience who was furious at not having been selected as a panelist was Stanton T. Friedman, a professional UFO lecturer who bills himself as the "Flying Saucer Physicist." Throughout the presentations, Friedman could be heard muttering and loudly declaiming comments whenever any speaker said something with which he disagreed.

Throughout the presentations, Stanton Friedman could be heard muttering and loudly declaiming comments whenever any speaker said something with which he disagreed.

In November of last year, I received an email from Lee Speigel, who writes "Weird News" for *The Huffington Post*. He said he was going to be giving a talk at the National Atomic Testing Museum the following month and wanted to know if I had any photos or other information about the Smithsonian UFO Panel. (Speigel attended that panel, which is where I first met him.) I sent him all the information I had.

Armed with that information, Palmer apparently went back to the folks at the Smithsonian and filled them in with the details on their own forgotten chapter about UFOs. After which, Palmer said, they told him, "Do anything you want, just don't put our name on it." So on the flier for the talk "The Real Roswell Story" given at the Museum on March 28, 2014, by Stanton T. Friedman, the words "Smithsonian-affiliated" do not appear. A small victory, I suppose. Very small.

More Smithsonian history: on April 19, 1978, I attended a debate there on the existence of ESP, between the famous parapsychologist Joseph Banks Rhine and skeptic and humanist Paul Kurtz. Clearly, it was another balanced discussion by experts. Kurtz wrote that the transcript of this debate was published by the Smithsonian Institution Resident Associate Program as "Key Issues in Science Today—The Paranormal: Science or Pseudoscience?" I would love to find a copy of it.

In the March/April 2014 issue of the Skeptical Inquirer, there was a short News and Comment piece, "Pseudoscience Creep: Science Museums, Universities Host Pseudoscience" by Jessie Haynes. In it, she notes how in 2005, the Smithsonian Institution hosted the screening of an antievolution film by the Discovery Institute, in return for a $16,000 contribution from that organization. She also notes other dubious presentations by museums and schools, concluding, "Pseudoscience is rampant in museums and schools across the United States, and unfortunately the media and likewise the public don't seem to care." ■

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No Health Risks from GMOs

Food safety is an important and emotionally charged issue. We all want our food to be safe. For most of us, however, the safety of our food is largely out of our hands. Other people grow, pick, clean, inspect, transport, and sell us our food. If you eat at a restaurant, others also prepare the food. It's understandable that there would be a certain amount of anxiety about what we are eating. Evaluating the safety, healthfulness, and nutritional value of everything we eat is hard work.

While reading food product labels is helpful, sometimes it is easier to substitute buzzwords, reassuring notions that promise wholesomeness such as "all natural," "organic," or "gluten-free." At the same time, the desire for simplicity can motivate some to demonize certain foods or food ingredients. There are those who want to demonize genetically modified organisms (GMOs) and are even pushing for labeling so that the so-called "frankenfoods" can be easily stigmatized.

There is some legitimate controversy over the optimal regulation of GMOs, the environmental effects and best practices involving specific GMO crops, and GMOs' potential for the future. Like many public controversies, the debate can be better informed by scientific evidence; however, there is no legitimate scientific controversy over the safety of GMOs.

There is a solid scientific consensus that currently approved GMO crops are safe for human consumption. Despite this consensus, a recent Gallup poll (http://www.gallup.com/poll/6424/nutrition-food.aspx) asked the following question: "From what you know or have heard, do you believe that foods that have been produced using biotechnology pose a serious health hazard to consumers, or not?" Of the respondents, 48 percent said yes, and 36 percent said no.

A mother holds a sign saying "Ban GMOs now!" at an anti-GMO/Monsanto rally in Pack Square in Asheville, North Carolina, USA, on May 25, 2013.

An ABC News poll (http://abcnews.go.com/Technology/story?id=97567&page=1) reported that 52 percent of those surveyed believe GMO foods are unsafe, 93 percent favor mandatory labeling, and 57 percent said they would use such labeling to avoid GMO food (although California recently rejected a ballot to require such labeling). It is not uncommon for there to be a disconnect between public opinion and scientific evidence. It is particularly easy to stoke fears—and very difficult to quell those fears with abstract scientific evidence, which presents a serious challenge to scientists, science communicators, and those involved in public policy.

GMO Fears

Public fear of GMOs is largely based on false premises and misinformation as well as on the highly popular but invalid naturalistic fallacy: the notion that things that are "natural" (a concept that is often poorly defined) are automatically more wholesome and safe than anything synthetic or artificial. GMOs are often thought of as mutants, unnatural, even abnormal. Defenders of GMOs are quick to point out that almost all food consumed by humans has been significantly changed over hundreds or thousands of years through breeding and cultivation. What we eat today bears little resemblance to its naturally evolved ancestors.

GM technology involves various techniques, and we should not conflate them or treat all GMOs as one single entity. Each GMO should be evaluated on its own merits. Some GMOs are created by turning off a normally expressed gene, so there isn't even the introduction of a new gene. Others, called "cisgenic," involve introducing genes from closely related species, ones that could be achieved through hybridization and breeding. Still others, called "transgenic," involve genes from

distant species, even crossing to other kingdoms of life (such as taking a gene from a bacterium and inserting it into a plant).

Transgenic genetic modification in particular can create the feeling of contamination. This is largely based on a lack of appreciation for evolution, however. First, all living organisms are the products of mutations. We are all mutants. Genes are changing things, no matter what method is used to bring those changes about. Farmers waiting for generations for plants to fortuitously display a favorable mutation—and then cultivating those plants in order to create a new variety—is just a slower method of causing genetic change.

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GMO critics argue that taking genes from distant species is inherently risky because of gene regulation and unforeseen consequences. There is no evidence to support this contention, however. Sometimes genes from distant species find their way into genomes through horizontal transfer. This happens in nature with regularity. Further, people generally underestimate the similarity in genetic information across the tree of life.

The "fish-tomato" is the perfect example of this misunderstanding of evolution. Rumors were spread by anti-GMO critics of a GMO tomato that contained a fish gene. This was meant to shock the public. The Union of Concerned Scientists (a group, in my opinion, with clear ideological leanings) expressed concern (Mother Earth News Editors 2000). "But Jane Rissler of the Union of Concerned Scientists says otherwise: 'The fact is, it has been done . . . DNAP [DNA Plant Technology of Oakland, California] was the company—that put the fish gene in a tomato.' Rissler acknowledges that the experiment was halted before any products were brought to market, but, she insists, 'that is because of the uproar. Believe me, they would be doing it if people were not objecting to it.'"

The real question here is not whether there is a GMO tomato with a fish gene, but who cares? It's not as if eating fish genes is inherently risky—people eat actual fish. Furthermore, by some estimates people share about 70 percent of their genes with fish (Kettleborough 2013). You have fish genes, and every plant you have ever eaten has fish genes; get over it.

Some fears are based upon consumption of "mutant" genes themselves. This is unfounded, partly because, as I stated above, all genes are mutants. Also, we regularly consume genetic material in our food. Our bodies handle it quite well without risk. Further, there is at least an order of magnitude more bacterial cells in your body expressing over 300 times as many genes as human genes (Kelvin 2012). You are awash in genetic material from other organisms, and you would not notice an extra "fish" gene in your tomato.

The point of the fish-mato, however, is to provoke a disgusted emotional response, not to elucidate a genuine risk. Perhaps the most legitimate concern about introducing new organisms into the human food chain is the potential for allergies. Some people have food allergies, and new proteins could potentially trigger previously unknown allergies. GMOs, however, do not represent a particular allergenic risk. Testing and monitoring are sufficient to evaluate potential allergies, and so far this potential risk has not manifested.

Evidence for Safety

So, what does the scientific evidence say with regard to the safety of current GMOs? A 2012 statement by the American Association for the Advancement of Science (AAAS) concluded: ". . . Contrary to popular misconceptions, GM crops are the most extensively tested crops ever added to our food supply. There are occasional claims that feeding GM foods to animals causes aberrations ranging from digestive disorders, to sterility, tumors and premature death. Although such claims are often sensationalized and receive a great deal of media attention, none have stood up to rigorous scientific scrutiny. Indeed, a recent review of a dozen well-designed long-term animal feeding studies comparing GM and non-GM potatoes, soy, rice, corn and triticale found that the GM and their non-GM counterparts are nutritionally equivalent" (http://www.aaas.org/news/releases/2012/media/AAAS_GM_statement.pdf).

The National Academy of Sciences/National Research Council agrees (NRC 2004): "To date, no adverse health effects attributed to genetic engineering have been documented in the human population." The World Health Organization also agrees (WHO 2005): "GM foods currently traded on the in-

ternational market have passed risk assessments in several countries and are not likely, nor have been shown, to present risks for human health." As referred to by the AAAS, reviews of animal feed studies have concluded (EFSA 2008): "Results obtained from testing GM food and feed in rodents indicate that large (at least 100-fold) 'safety' margins exist between animal exposure levels without observed adverse effects and estimated human daily intake. Results of feeding studies with feed derived from GM plants with improved agronomic properties, carried out in a wide range of livestock species, are discussed. The studies did not show any biologically relevant differences in the parameters tested between control and test animals."

Even the European Union, which is politically not favorable to GMOs, had to acknowledge in its review of the research (European Commission 2010): "The main conclusion to be drawn from the efforts of more than 130 research projects, covering a period of more than 25 years of research and involving more than 500 independent research groups, is that biotechnology, and in particular GMOs, are not per se more risky than e.g. conventional plant breeding technologies."

Not only is there extensive independent research and evidence for the safety of GMOs generally and specific GMOs, but this evidence is greater than for any other food crop.

The Precautionary Principle

For anti-GMO activists, apparently, no amount of evidence is sufficient. The precautionary principle, that we should err on the side of caution, especially with new technologies, is perfectly reasonable but can be taken too far. There is no such thing as zero risk or absolute proof of the absence of any risk or negative effect. This is true of everything we do, everything we consume, every medical intervention, and every technology.

However, it is easy to seem reasonable by invoking the precautionary principle, to simply ask for reassurance of safety and more testing. This plays well with the public; everyone wants to be safe. The real question is, however, where are our thresholds for safety? How much evidence do we need? Those who are ideologically anti-vaccine play this game well, always calling for more research, insisting on zero risk, and asking specifically for the kind of research they know will never be done (such as for ethical reasons). Anti-GMO activists are playing the same game. Despite the overwhelming evidence for the safety of GMOs, more than for any other food, it's never enough. They want decades-long prospective studies looking at every possible negative outcome—but just for GMOs, not other foods. Like the anti-vaccinationists, they set the bar as high as necessary so that, if followed, GM would effectively be killed. They don't want safe GMOs; they want no GMOs.

Genetic modification is easy to portray as a new and scary technology, but fearmongering is largely based on misinformation, a misunderstanding of evolution and our place in the natural world, and vague fears of contamination.

Conclusion

Genetic modification is easy to portray as a new and scary technology, but fearmongering is largely based on misinformation, a misunderstanding of evolution and our place in the natural world, and vague fears of contamination. In reality, GMO safety testing is extensive and has not uncovered any safety concerns for current GMOs. There are other issues with GMOs that are worth discussing, but fears of adverse health effects are not legitimate. ■

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The Lure of Mysterious Paintings, Part 2

In continuing our discussion on "mystery" paintings from the past: a special place is held by paintings that are said to hold hidden meanings—especially when they do.

The Garden of Earthly Delights by Hieronymus Bosch.

Hidden Symbols

The Ambassadors by Hans Holbein the Younger (1533) is a highly symbolic painting. The two diplomats depicted, Jean de Dinteville and Georges de Selve, are portrayed with one in secular clothes and the other in clerical robes. The objects on the table (both celestial and terrestrial globes) as well as the oriental carpet allude to the exploratory nature of the professions of the two subjects. However, there are also various measuring instruments for scientific and technical symbols of materialism, along with books and symbols of religious knowledge. Therefore, it could be a symbolic representation of the union between capitalism and the church. The lute with the broken string, however, represents discord. The Lutheran hymnbook might suggest a conflict between academics and clergy.

Without a doubt, though, the most mysterious symbol within the frame is the strange figure stretched on the floor. When one looks at the picture from the right side and a few feet away, the deformation disappears, and the picture appears for what it is in reality: a human skull. The technique used is known as "anamorphosis," already described by Leonardo, and the meaning of the skull may be the classic *memento mori* (literally: "remember that you must die"). However, it remains to be seen why Holbein gave so much space to it in his painting. Perhaps the artwork was hanging along a staircase, in order to surprise those ascending the stairs who suddenly saw the skull, or maybe it meant that everything (the good clothes, tools, the luxury of the room), in spite of their beauty, is destined to dust. The only possible salvation is to be found in the crucifix, almost hidden in the top left of the canvas. Or, of course, perhaps Holbein simply wished to demonstrate his technical skills in order to assure further commissions.

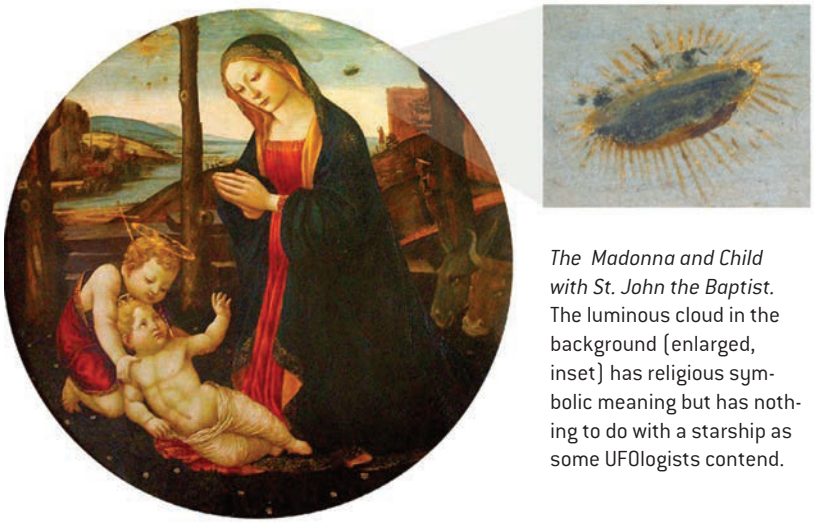
A Trio of Delicious Puzzles

Among the paintings whose symbolic interpretation is genuinely difficult and debated is the triptych known as *The Garden of Earthly Delights* painted by Hieronymus Bosch between 1480 and 1490. The large picture (220 cm by 389 cm), divided into three parts, is considered the first true surrealist painting of history. It is thought that it depicts, from left to right, the creation of Adam and Eve, the Garden of Earthly Delights, and, ultimately, hell.

Scholars have often interpreted the complex acts depicted therein as a warning to men about the dangers of the temptations of life. Over the centuries, however, the meaning of individual themes and fantastic figures, and the connection between them, has been widely debated. In particular, the central panel divides critics. There are those who believe that it contains a moral lesson for man about the deleterious consequences of the pleasures of the senses and the transience of life, and then there are those who consider it a view of paradise lost. Others, however, assuming that Bosch was a member of the Christian sect of the Adamites, view the panel as an ideal representation of free love, where sexuality is not intended as sin but as pure joy and ecstasy. None of these hypotheses, however, is totally convincing. Bosch himself—about whose life little is known—remains an unsolved riddle.

Alchemical Paintings

Among the most bizarre and extravagant artists in history is Giuseppe Arcimboldo, who produced complicated puzzles in which compositions of fruits, vegetables, flowers, birds, fishes, and other objects end up turning into original shapes and human faces. One of the most famous examples is the *Vegetable Gardener*, a bowl containing several vegetables that, once inverted, shows the placid and fat face of the titular Gardener.



The Madonna and Child with St. John the Baptist. The luminous cloud in the background (enlarged, inset) has religious symbolic meaning but has nothing to do with a starship as some UFOlogists contend.

For his work, Arcimboldo recovers Leonardo's physiognomic surveys in order to create paintings that seem simply grotesque and playful caricatures. But, just as the pictures he paints change their meanings by the assumption of a different point of view, so the true meaning of such paintings is deeper than it appears on the surface. Close to the magic-cabalistic culture of the sixteenth century, Arcimboldo, who worked for a long time as a painter at the Habsburg court in Prague, a city believed to be the European capital of esotericism at the time, was trying to revive in his paintings the ancient philosophy of "solve et coagula," decompose and recompose, typical of alchemy. The choice of individual objects used, such as the vegetables of the Gardener, hints to a hidden meaning related to the theories of the elements, the humors, and the five senses.

Contemporary Fantasies

To see the ancient paintings as puzzle games in which one can search for ambiguous messages and double or hidden meanings, however, is a very modern trend, which inevitably leads to interpretations so outlandish as to be often unfounded. It's the case, for example, of *The Shepherds of Arcadia* by Nicolas Poussin, painted in 1640, and mentioned in relation to the "treasure" of Rennes-le-Château. The group of idealized shepherds in classical antiquity, grouped around an austere tomb on which is written the phrase "Et in Arcadia ego" (literally: "I too was in Arcadia," an ancient form of *memento mori*), was originally inspired by a similar picture painted by Guercino. However, since the 1980s the work has been reinterpreted by pseudohistorians who imagined the painting loaded with clues about the alleged descendants of Christ, very similarly to what happened to Leonardo's *Last Supper*.

In particular, the words "Et in Arcadia ego," duly rearranged (and with the addition of a few letters here and there) were transformed into "I Tego Arcana Dei," meaning: "Go away! I hide the mysteries of God." As if to say that that could even be the tomb of Jesus after he had escaped the Crucifixion and retired with his family on the hills of France to die an old man. Poussin, in short, would have been the member of an esoteric society that intended to leave a hidden trace of this secret in order to hand it down to posterity. Despite the fact that hiding clues in paintings is often invoked in legends relating to hidden treasures, it appears that there are no examples of a similar practice anywhere. Still, the idea of the "encrypted painting" persists and thrives.

A UFO in the Picture?

If a modern observer can find just about anything in a painting dating to five or six centuries ago, why not look for a flying saucer? That's precisely what happened with several Renaissance paintings. One of the most famous is the *Madonna and Child with St. John the Baptist* attributed to Sebastiano Mainardi. The picture is dated to the end of the fifteenth century and is today at the Museum of Palazzo Vecchio in Florence. At the top of the painting, behind the shoulders of the Madonna, stands a strange oval shape suspended in the sky. According to some UFOlogists this is "an object plane, lead-gray, tilted to the left and has a 'dome' or 'turret,' apparently identifiable as an oval-shaped steering wheel in motion."

To understand what this or any other ancient paintings depict in reality, though, it is essential to understand how painters worked in the past. And, usually, no one who sees UFOs in paintings bothers to inquire about the possible symbolic meanings of these strange elements in the art of that period. The flying object in Mainardi's painting and others similar to it, in fact, is nothing more than a "luminous cloud." At the time, in the case of worship paintings, there often was in the sky a bright cloud, or an angel, as narrated in some apocryphal Gospels. Even the man on the right of the painting, who covers his eyes looking into the sky, is a characteristic feature of this type of picture. It seems, however, that rather than looking at the cloud the man directs his stare toward the Star of the Nativity and the three small stars (top left in the picture), symbols of the threefold virginity of Mary: not surprisingly, these as well have been interpreted by some as "starships." ■

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Childhood Obesity, Fast Food, and the Overstuffed Elephant in the Room

One in three American children were confirmed overweight or obese in 2009 [1]. Since then, few if any health statistics have been more widely publicized. Five years later, however, we still don't seem to understand how we've accomplished this for our kids.

Biologists and anthropologists have broadly indicted certain evolutionary mismatches between our contemporary "obesogenic" environment and biological adaptations naturally selected thousands or even millions of years ago (Power and Schulkin 2009). These incongruities generally fall into two categories.

First, present-day humans are thought to naturally favor inactivity and, thus, to consistently burn too few calories. The role of exercise in body composition control is complicated and somewhat controversial. Regardless, it is not the subject of this column.

Second, Westerners especially are accused of consuming too many total calories or too many inappropriate foods. Diet's role in the obesity crisis is far clearer and more convincing. Indeed, specific culprits—high glycemic index carbohydrates, in particular—have been identified.

But a much more practical question remains, implicating both personal behavior and public policy. From what cultural sources does the problem primarily emanate, and in what relative proportions? In other words, precisely *where* are American children really getting fat?

Myriad scholars and government officials have vigorously impugned the fast-food industry. And why shouldn't they? As the prevalence of overweight and obesity has tripled among American children in the last thirty-five years, the percentage of total energy intake consumed from fast food has risen from 2 percent in 1978 to 13 percent in 2006.

Unsurprisingly, fast-food outlets continue to stuff their menus with perhaps the poorest nutritional options imaginable. On average, fast foods are higher in solid fat (23.9 percent of total energy) than food from either retail stores (17.6 percent) or schools (20.9 percent). Compared with nonconsumers, kids who eat fast food receive higher levels of total energy, total fat, and saturated fat. They also consume less fiber, milk, fruit, and vegetables and more sugar-sweetened beverages and French fries.

So what's not to detest about fast food? Very little or nothing at all, we might agree, but that's not the question at hand. Instead, we might ask whether the evidence truly condemns fast food as a proximate cause of childhood obesity and, if not, whether fast food serves only as a relatively unobjectionable scapegoat for a far more likely suspect.

The Centers for Disease Control

and Prevention (CDC), one of the main operating arms of the U.S. Department of Health and Human Services, has published an authorless online report titled "Incorporating Away-From-Home Food into a Healthy Eating Plan." The article focuses on the relationship between childhood obesity and food-away-from-home (FAFH)—including fast food but not school meals.

With about one-third of the average American's daily calories coming from FAFH, the report opines, "It is important to consider how individuals can fit these items into a healthy eating plan." Assumed but not supported in this decree is the conviction that Americans who consume significant amounts of fast food are interested in a healthy diet and, if so, are capable of recognizing, preparing, and consistently consuming one.

After reciting the familiar nutritional and proportional shortcomings of FAFH, the report references dozens of studies thought to demonstrate a robust association between FAFH and overweight or obesity. One study, for example, found that both adult and child fast-food eaters consumed more calories, fat, and sodium, and less vitamins, milk, fruits, and vegetables than non–fast-food eaters. Another discovered that states with higher levels of obesity had more fast-food restaurants. Other longitudinal studies associated higher frequencies of fast-food consumption among girls, boys, and adults with elevated BMIs or adiposity.

In the end, the CDC cautioned that the available literature had yet to conclusively establish a direct causal link between FAFH and obesity. Nevertheless, it left readers with a series of nutritional and behavioral prescriptions revealing an unyielding confidence that FAFH *per se* continues to supply the United States with an increasing number of overweight and unhealthy children.

For example, the report urges fast-food consumers to "tailor away-from-home meals to make them as healthful as possible," and to "control food and beverage portions" by sharing, ordering half-portions, or taking the excesses home. It concludes with a plea to "reduce reliance on away-from-home food." But never does the CDC report consider whether fast-food consumption might be a mere marker for a more instrumental set of bad nutritional attitudes and habits.

In 2010, four researchers at the Economic Research Service of the U.S. Department of Agriculture published a similar but more involved report, "How Food Away From Home Affects Children's Diet Quality" (Mancino et al. 2010). Led by Lisa Mancino, the group purportedly set out, first, to test the now-popular childhood obesity–FAFH hypothesis and, second, to help inform public-policy prevention strategies.

Mancino's report provides Americans with yet another remarkable set of statistics that might well induce effective behavior change assuming two premises: first, that fast food actually causes childhood obesity and, second, that the target population is open to such adjustment.

Mancino's analysis was based on data from the 2003–2004 National Health and Nutrition Examination Survey and the 1994–1996 Continuing Survey of Food Intakes by Individuals. Children ages six to eighteen were included, and FAFH was defined as all commercially prepared food—featuring fast food but not food from schools. Results were based on both relative caloric intake and diet quality, as measured by the 2005 Healthy Eating Index. Mancino also attempted to control for the impacts of sugar-sweetened beverages and certain personal characteristics such as food access and preferences.

The government's findings were striking, of course, but far from unexpected. For all children, Mancino discovered, each FAFH meal added sixty-five total calories and lowered diet quality scores by 4 percent compared to meals prepared at home. Older children between thirteen and eighteen fared significantly worse, receiving 107 additional calories.

Mancino's report provides Americans with yet another remarkable set of statistics that might well induce effective behavior change assuming two premises: first, that fast food actually causes childhood obesity and, second, that the target population is open to such adjustment. But do Mancino's results truly speak to the foundational issue of causation?

She and other officials at the U.S. Department of Agriculture certainly seem to think so. Her study's findings, they contend, not only "support the contention that increased consumption of FAFH is a contributing factor in the current epidemic of childhood obesity" but also "strengthen the argument that there is a causal relationship between FAFH and increased caloric consumption and decreased dietary quality."

Again, the possible effects of other food—even food from the most ubiquitous source available to children—were never discussed. But isn't it far easier to intuit, for example, that American kids are getting fat *and* consuming fast food as a result of nutritional habits and attitudes established at home?

A very similar question occurred quite recently to three nutrition scientists led by Barry Popkin at the University of North Carolina at Chapel Hill. In a new study supported by both the Robert Wood Johnson Foundation and

the National Institutes of Health, Popkin's group attempted to distinguish and compare the independent associations between childhood obesity and either fast-food consumption or the remainder of dietary intake (Poti et al. 2014).

Popkin's cross-sectional analysis included 4,466 children ages two to eighteen who participated in the 2007–2010 National Health and Nutrition Examination Survey. In terms of fast food, the young subjects were classified as either nonconsumers, low-consumers (0.1-30 percent of energy), or high-consumers (>30 percent). Popkin's group also attempted to control for various potential confounders, including physical activity levels, sex, age, race-ethnicity, and parental income and education.

The authors first note that previous research has focused intensely on fast food as the key contributor to the rising incidence of childhood obesity. But prior studies, they argue, tended to "control for, rather than explore, the differences between fast-food consumers and nonconsumers." Indeed, the mere possibility that fast food might not be directly associated with childhood obesity, they agree, had until that point never been tested.

So Popkin set out to address the problem anew by incorporating and analyzing food choices made outside the fast-food restaurant. In other words, to test his hypothesis that a nutritionally imprudent at-home diet actually associates more robustly with overweight than fast-food consumption *per se*, Popkin contrasted the at-home dietary patterns of fast-food nonconsumers, low-consumers, and high-consumers.

After examining the remainder of dietary intake, then, the authors discovered that the children had clustered into two distinct groups. Roughly half consumed a typical "Western diet," characterized by higher intakes of sugar-sweetened beverages, salty snacks, high-fat sandwiches, and candy; the others ingested a "Prudent diet," marked by higher intakes of milk, fruit, and low-fat mixed dishes.

Popkin's results defied received institutional wisdom. First, both fast-food high- and low-consumers were significantly more likely to consume a Western at-home diet than nonconsumers (63.4 percent, 54.2 percent, and 43.9 percent, respectively). Second, children who combined both high–fast-food consumption and a Western diet showed significantly higher prevalence of overweight or obesity than prudent nonconsumers (40.4 percent and 28.0 percent, respectively).

Absent consideration of the remainder of dietary intake, high–fast-food consumption was significantly associated with a higher incidence of overweight. But that association, the authors emphasize, was "attenuated and nonsignificant after adjustment for the remainder of diet." On the other hand, "consuming a Western dietary pattern . . . was significantly associated with a higher prevalence of overweight/obesity after control for fast food intake."

In sum, when both eating behaviors were considered, "the remainder of diet, but not fast food per se, was associated with overweight/obesity." In previous obesity studies, Popkin adds—including the 2010 analysis conducted by Mancino and other officials at the U.S. Department of Agriculture—"associations between fast food intake and these health outcomes were overestimated."

The authors close with an aspirational missive to American policy-makers. These new findings, they warn, also "suggest that the effect of public health efforts targeted at fast food restaurants may also be overestimated" and "not sufficient to reduce childhood obesity if the remainder of the diet is not also addressed."

As always, the research must continue. Nevertheless, common sense should inform us all that childhood obesity originates, matures, and proliferates in the home. Children don't live in fast-food restaurants, after all, and restaurateurs are not responsible for the teaching of lifestyle values, attitudes, and habits to our kids. No family has ever been forced to consume ridiculously inappropriate "foods" or to sit in front of the television set to view obviously manipulative advertisements. Plainly, no aspect of fast food will ever be the real issue.

On the other hand, should the U.S. government continue to intercede between childhood obesity and its genesis, it should do so efficiently and scrupulously. And if any government official genuinely desires to affect childhood obesity, then he or she will surely speak the *entire* truth to the one true political power (and to the party that needs to hear it most)—that is, the American majority. ■

Note

1. Recent studies and media reports alleging a decline in U.S. childhood obesity may have been mistaken. Instead, new research finds that all classes of childhood obesity, especially severe obesity, have increased in the last fourteen years: Skinner, A.C., and Skelton, J.A. 2014. Prevalence and trends in obesity and severe obesity among children in the United States, 1999–2012. *JAMA Pediatrics.* Published online April 7, 2014. doi:10.1001/jamapediatrics.2014.21.

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Did Television Introduce Anorexia to Fiji?

Q: I'm hoping you can answer an eating disorder question. For years I've heard people casually mention that eating disorders followed after girls in a tribal culture were exposed to Western magazines with thin models. It could be legit, but it's structured like an urban legend. Do you know which it is?

—Michael Hartwell

A: Though the details aren't quite right, I'm familiar with the study you're referring to. I have researched the links between mass media, dieting, and eating disorders for many years. I first became interested in the topic after reading Naomi Wolf's best seller *The Beauty Myth*, in which Wolf claimed that images of thin women in the mass media caused, or at least contributed to, eating disorders in women. Over the past twenty-five years this claim has been widely repeated and accepted as fact, though both my background in psychology and my research into the mass media (the subject of my 2003 book *Media Mythmakers: How Journalists, Activists, and Advertisers Mislead Us*) raised doubts about this claim. I recently completed my master's in education degree through CFI's Science and the Public program and wrote my thesis on the subject of eating disorder misinformation.

When you research a subject like media-caused eating disorders, you find a handful of studies widely referenced in both popular and scholarly discussions of the subject. One of the most famous studies of the effects of mass media on

girls involved teens in Fiji and what happened to them after television was introduced to the island in 1995. The study, led by Harvard's Anne Becker, is considered especially important and valuable because it allowed a very rare glimpse into a culture that had not been previously exposed to television. The study is often described as proving that television (particularly images of thin, beautiful American actresses) led to anorexia and body image disturbance in young women; for example, a *New York Times* headline (Goode 1999) stated that "Study Finds TV Alters Fiji Girls' View of Body."

Here's how one writer, Sylvia Lerigo, cast the story:

> Compared to the past, when simply "being" was the priority, Fijian teens had become as obsessive about body image and weight as teenage girls in the West who were suffering with conditions like anorexia. Prior to this invasion of television, the Fijian female body was considered more attractive when fuller and naturally feminine, which Fijians considered ideal for childbearing and child rearing. Becker noticed that almost 74% of young women in Fiji considered themselves "too fat" and thinness was what most Fijian teens craved.

The Fiji study is often cited as strong evidence that exposure to thin images in the mass media are linked to eating disorders and have implications for American teen girls as well. It's not quite an urban legend, but it's not quite true either. Here's a closer look at what the study found.

In Becker's 2002 study ("Eating Behaviours and Attitudes Following Pro-

longed Exposure to Television among Ethnic Fijian Girls"), Becker and colleagues visited Fiji in 1995, a few weeks after television was introduced to the island, and returned three years later in 1998 to see what effect the new medium had on girls.

Each time they asked school-age Fijian girls (average age, seventeen) about how much TV they watched (and their attitudes about the programming) and questions about their bingeing and purging behaviors. High scores on an eating disorder scale increased 12.7 percent, and induced vomiting to control weight increased 11.3 percent between 1995 and 1998. Becker concluded that "key indicators of disordered eating were significantly more prevalent following exposure to television."

This conclusion has been touted by media critics and others worried about the influence of television and popular culture on today's youth. There are several important caveats that should be kept in mind when considering the study's validity that are rarely mentioned and only become apparent upon a close reading of the research. For example:

1) Becker's study involving Fijian girls had a total of only sixty-three participants in 1995, and sixty-five in the 1998 follow-up. This is a small sample size, which makes the study's conclusions difficult to generalize. A sample size of at least a few hundred subjects would provide much better evidence that the findings were valid. Fiji had a population of around 85,000 people in 1995, and it's not at all clear that a sample of sixty-four teen girls represents the population as a whole. Furthermore, only one-third (29.2 percent) of the 1998 sample—nineteen girls—scored high on the eating disorder behavior test.[1] Two-thirds of the girls had no increase on that test, and thus Lerigo's claim that "Fijian teens had become as obsessive about body image and weight as teenage girls in the West who were suffering with conditions like anorexia" seems misleading at best.

There's also the puzzling fact that while Becker takes pains to state that eating disorders were essentially unheard of in Fiji prior to the introduction of television, she found eight girls (out of sixty-three) who scored high on the 1995 test, a mere two or three weeks after television was introduced to the island. This group is considered the "before TV exposure" group, yet 12.7 percent of the girls apparently scored high on the test with little or no television exposure. Yet after three years of exposure to the mass media's constant thin images and unhealthy messages broadcast to tens of thousands of people, only twelve additional girls scored high on the test. While an increase from 12.7 percent to 29.2 percent is statistically significant, it seems like a curiously small increase if the mass media is as powerful as is often assumed.

There's also the puzzling fact that while Becker takes pains to state that eating disorders were essentially unheard of in Fiji prior to the introduction of television, she found eight girls (out of sixty-three) who scored high on the 1995 eating disorder test, a mere two or three weeks after television was introduced to the island.

2) The girls, though claiming to diet and wanting to emulate the bodies of thin TV actresses, did not lose weight between the 1995 and 1998 surveys. Becker notes, "There were no significant differences between the samples in mean age or body weight," and in fact if anything the girls got slightly fatter, as the average BMI increased from 24.5 to 24.9. Thus the Fijian girls were a hair's breadth away from being overweight (BMI of 25 or higher) both before the introduction of TV and three years later; there's no evidence that exposure to the TV images led to any weight loss or anorexia.

This puts Lerigo's comment that "Becker noticed that almost 74% of young women in Fiji considered themselves 'too fat'" in a whole different light. If you hadn't read the study, it would seem to suggest that these thin or normal-weight girls had been brainwashed into believing they should be thin like Jennifer Aniston. Instead, the reason that 74 percent of Fijian girls considered themselves "too fat" was because they *were* too fat. This has nothing to do with thin models in mass media and everything to do with typically high-calorie Fijian diets.

3) Fijians were incredibly naive about television. According to Becker, the girls they interviewed believed that TV shows like *Seinfeld*, *E.R.*, *Home Improvement*, *Beverly Hills 90210*, and *Friends* were news stories and reality shows. They did not understand that the people they were seeing were actors. These subjects, by their own admission, could not understand the difference between a scripted sitcom and real life, yet they were being asked complex questions about their attitudes regarding the TV characters. On this important measure alone, American teen girls are polar opposites from the

Fijian girls. Young women are very media savvy and certainly don't mistake *Grey's Anatomy* or *The Big Bang Theory* for a news report or documentary. This seriously undermines attempts to draw parallels between the Fiji study and the media's influence in modern America (something most writers on the issue, including Lerigo, specifically do). Indeed, Becker herself points this out in her study: "Generalization about the impact of television upon Fijians to other populations requires caution" (p. 512).

Even though television was only introduced to Fiji in 1995, mass media images of thin models and actresses circulated widely in Fiji for many years in the form of magazines, newspapers, popular films, and so on. Thus it was not, as often claimed, a culture where teen girls had little exposure to a Western "thin body ideal."

4) Becker did not determine whether or not the sixty-five girls in the 1998 follow-up study had disordered eating symptoms or attitudes before 1995. Because the same population of girls was not used (which would control for this variable), there is no way to know whether or not television caused the increase or not. Put another way, for all Becker knows, the girls she interviewed in 1998 might have scored high on the disordered eating test *before they ever watched television*, if Becker had tested them in 1995. Furthermore, even though television was only introduced to Fiji in 1995, mass media images of thin models and actresses circulated widely in Fiji for many years in the form of magazines, newspapers, popular films, and so on. Thus it was not, as often claimed, a culture where teen girls had little exposure to a Western "thin body ideal."

5) Becker apparently did not take into account various other possible confounding factors that co-occurred in Fiji between 1995 and 1998. The introduction of television was surely one important influence on teens, but was it the only one? What other social, cultural, economic, religious, or other factors were changing at the same time that television was introduced? It's not clear how Becker et al. determined that other factors did not play a role in self-perception and body dissatisfaction. Correlation does not imply causation, and just because television was introduced before the additional twelve girls scored high on an eating disorder test does not mean that television caused the increase.

6) Becker has been quoted in several places, including a recent Discovery News article, stating that "[Fijian] girls told us they thought these actresses were role models." This led many people to assume that most of the Fijian girls were saying they saw the actresses' thin bodies as physical role models.

But that's not what the 2002 study says: Instead, Becker writes (p. 511) "30% of those interviewed indicated that television characters served as role models concerning work or career issues." These are two very different things. Instead of an implied majority of girls saying they wanted to have a thin body like Kate Moss or Heather Locklear, fewer than one-third of the girls said that the actresses were role models—and the ones who did explicitly stated that the actresses were not role models because of their body shape but because of their professional careers. Seeing a person on television and saying "I wish I could be a news anchor like Katie Couric, or the Secretary of State like Hilary Clinton" is very different from saying, "Wow, I wish I had her thin body."

All this does not mean that the famous Fijian study is invalid, but it's important to understand the limitations of the research and what the study actually found. There is, of course, nothing new about advocates for a particular agenda ignoring important caveats and flaws in studies they cite; this occurs routinely in partisan politics, social and environmental issues, and elsewhere. But the fact is that this widely cited, highly touted research is far less definitive (and far more ambiguous) than is often claimed. There may be strong, compelling research linking thin media images to the onset of anorexia and body dissatisfaction in young women, but this study is not it. ■

Note

1. The test Becker administered to the Fiji sample, EAT-26, consists of twenty-six questions about food, dieting, and bingeing/purging attitudes and behaviors. Scoring high on the EAT-26 inventory does not diagnose a person with anorexia or any other eating disorder but merely indicates the presence or absence of characteristics correlated with disordered eating. In other words, people with anorexia will score high on the test, but not everyone who scores high on the test has anorexia.

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The articles in this special issue on science and religion address a variety of specific new issues and problems. As always with the SKEPTICAL INQUIRER, our emphasis is on new scholarly data; topical developments; and scientifically and empirically informed, yet diverse, viewpoints. —The Editors

Would the World Be Better Off Without Religion?

A Skeptic's Guide to the Debate

The widespread assertion that the world would be better off without religion is a reasonable hypothesis. Yet data suggest that skeptics should attach no more than a modest level of probability to it.

SCOTT O. LILIENFELD AND RACHEL AMMIRATI

If you Googled the question constituting the title of this article—or minor variants of it—as the first author of this article did on Christmas Day of 2013, you'd end up with more than 650,000 hits. This high number attests to the keen public interest generated by this age-old question. Indeed, few topics have generated more impassioned discussion among religious believers and skeptics alike. For example, in 2007, the British organization Intelligence-Squared hosted a lively debate on the proposition that "We'd be better off without religion," with proponents of the motion—Richard Dawkins, A.C. Grayling, and Christopher Hitchens—squaring off against the opponents Julia Neuberger, Professor Roger Scruton, and Nigel Spivey. Over the past decade, a seemingly never-ending parade of books and articles have tackled "the question," as we dub it, from various angles; entering the phrase "better off without religion" into an Amazon.com book search yields over 130 results.

Arguably, what is most striking about responses to the question by many prominent partisans on both sides is their extremely high level of confidence in the answer. For example, in a 2011 interview with *Slate* magazine, author and political commentator Dinesh D'Souza opined that "For a truly secular society, we should look to Stalin's Russia or Mao's China. But that's the tip of the iceberg … The result [of these societies] has inevitably been repression, totalitarianism, persecution of the churches, and just a miserable society" (Weingarten 2011). Turning to the opposing side, in an interview with journalist Laura Sheahen (2007), evolutionary biologist Richard Dawkins embraced the unequivocal position that the world would be a far better place without belief in God, contending that religion increases the chances of war and political discord. Sheahen asked him, "If you had to make a case for religion—one positive, if minor, thing religion has done, what would it be?" Dawkins responded, "It's true that some kind, nice, sympathetic people are also religious, and they might say that their kindness is motivated by religion. But equally kind people are often not religious. *I really don't think I can think of anything; I really can't.*" (emphasis added; http://salmonriver.com/environment/dawkinsinterview.html). Later, in a 2013 interview with CNN, Dawkins maintained, "The very idea that we get a moral compass from religion is horrible" (Prager 2013).

In this article, we address the overarching question of whether high levels of certitude are warranted among partisans of either position. In the interest of full disclosure, both authors of this article are atheists. At the same time, we have become concerned by what appears to be unjustified dogmatism by both religious skeptics and believers in discussions concerning an exceedingly complex and multifaceted question. Therefore, we attempt to demonstrate that (a) scientific data bearing indirectly on the question have routinely been neglected by many individuals on both sides of the debate; (b) such data, although informative, do not permit anything approaching conclusive answers to the question of whether religion makes the world a better or worse place. At the same time, such data cast serious doubt on broad-brush contentions (e.g., Dawkins 2006) that religion is usually or always associated with a heightened risk of immoral behavior, including violence. Hence, we view our article as a modest call for greater epistemic humility on the part of ardent defenders of both positions.

Is the Question Even Answerable?

In practice, the question posed here is probably not answerable with cer-

tainty because a genuine experimental test of the question is impossible. For both pragmatic and ethical reasons, we could never randomly assign individuals to a condition in which they were raised in a religious environment and randomly assign others to be raised in a nonreligious environment, all the while ensuring that all participants in this fanciful *Gedanken* experiment experienced little or no contact with the contrasting worldview. Putting it differently, we will almost certainly never know the *hypothetical counterfactual* (Dawes 1994) to the question posed at the article's outset; by "hypothetical counterfactual," we mean the outcome that would have resulted had the world, or a large chunk of it, never been exposed to religion. That is not to say, however, that circumstantial scientific data cannot inform the question or adjust a rational individual's assignment of probability to its answer.

Moreover, the question as commonly phrased ("Would the world be better off without religion?") is probably not strictly answerable with scientific data because the word *better* necessarily entails a series of value judgments. Reasonable people will surely disagree on what would make the world a better place. Would the world be "better" with more political conservatism, invasive animal research, modern art, McDonald's hamburgers, or Justin Biebers? The answers to these queries are matters of personal preference and lie outside the boundaries of science (although we would dispute the rationality of readers who reply "yes" to the last option). Nevertheless, when scholars have pondered whether the world would be better off without religion, the lion's share have almost always referred, either implicitly or explicitly, to a world that is more humane—one in which people treat each other kindly. For provisional research purposes, we can operationalize this propensity roughly in terms of lower rates of aggression and higher rates of altruism. In this article, we therefore address the more tangible question of whether a world devoid of religion would witness (a) lower levels of criminal and antisocial behavior[1], including violence, and (b) higher levels of prosocial (altruistic) behavior than a world with religion.

It should perhaps go without saying that the question of whether the world would be better off without religion has no logical bearing on the ontological question of God's existence. It is entirely possible to maintain that (a) God does not exist, but belief in God makes the world a more humane place on balance, or (b) God does exist, but belief in God makes the world a less humane place on balance. Indeed, a group of scholars who are sometimes encompassed under the rubric of Atheism 3.0 have recently lobbied for (a). They maintain that although there is no God, belief in God makes the world a kinder and gentler place (e.g., Sheiman 2009).

Surprisingly, the extensive body of social science data bearing on the links between religion and both moral and immoral behavior have typically gone unmentioned in public discussions regarding the merits or demerits of religion.

In any case, it should be beyond dispute that the question of God's existence is logically and factually independent of the question of whether belief in God's existence is beneficial for the human species. Nevertheless, it is all too easy to conflate these two questions, and we suspect that many partisans on both sides of the debate have done so, at least implicitly. If one concludes that belief in God is rational, one may be tempted to assume that belief in God would make the world a better place; conversely, if one concludes that belief in God is irrational, one may be tempted to assume that belief in God would make the world a worse place. At the risk of adding yet another logical fallacy to lengthy lists of such fallacies (e.g., Bennett 2012), we term this the *argument from existence/nonexistence fallacy*.[2] In essence, this fallacy is the inverse of the familiar "argument from adverse consequences fallacy" (see Sagan 1995), in which one erroneously reasons backward from the adverse effects of a belief to gauge this belief's veracity (e.g., "Lack of belief in God has negative consequences, so therefore God exists"). In contrast, the individual committing the argument from the existence/nonexistence fallacy incorrectly presumes that accurate beliefs regarding the existence of an entity (e.g., God) will always or usually lead to more salutary real-world outcomes. Yet, as the psychological literature on positive illusions suggests (Taylor and Brown 1988; but see Colvin and Block 1994, for a dissenting view), inaccurate beliefs may in some cases be tied to more adaptive outcomes, including higher levels of well-being and more satisfying interpersonal relationships.

The Neglect of Research Evidence

Surprisingly, the extensive body of social science data bearing on the links between religion and both moral and immoral behavior have typically gone unmentioned in public discussions regarding the merits or demerits of religion. Two high-profile examples from religious skeptics are especially striking. In his 447-page book, *Breaking the Spell: Religion as a Natural Phenomenon*, philosopher and prominent atheist Daniel Dennett (2006) devotes at most two pages (pp. 279–280) to the question of whether religion helps to makes people more moral, dismissing it peremptorily:

> I have uncovered no evidence to support the claim that people, reli-

> gious or not, who *don't* [emphasis in original] believe in reward or heaven and/or punishment in hell are more likely to kill, rape, rob or break their promises than people who do. The prison population in the United States shows Catholics, Protestants, Jews, Muslims and others—including those with no religious affiliation—are represented about as they are in the general population. (p. 279)

Later, Dennett quips that

> . . . Nothing approaching a settled consensus among researchers has been achieved, but one thing we can be sure of is that *if* [emphasis in original] there is a significant positive relationship between moral behavior and religious affiliation, practice, or belief, it will soon be discovered, since so many religious organizations are eager to confirm their demonstration underlines the suspicion that it just isn't so. (p. 280)

It is safe to say that extremism of many kinds, religious or not, can predispose to large-scale violence, especially when conjoined with the deeply entrenched belief that one's enemies are not merely mistaken but deeply evil.

For unclear reasons, Dennett neglects to review several dozen studies and at least two large-scale reviews bearing directly on this question (Baier and Wright 2001; Ellis 1985), including substantial bodies of data on the relation between religious belief and criminal behavior, which we examine in the following section.

Similarly, in his 405-page book, *The God Delusion*, Dawkins (2006) devotes approximately two pages (pp. 229–230) to this question. Dawkins approvingly cites Dennett's aforementioned conclusions and refers only in passing to correlational data on the relation between religion and morality. Without citing any references to the substantial psychological and sociological literature on the topic, Dawkins maintains that "such research evidence as there is certainly doesn't support the common view that religion is positively correlated with morality" (p. 229). Instead, on the same page, Dawkins cites only one observation, from neuroscientist Sam Harris (2006), that U.S. states that tend to be more socially conservative (and that are also characterized by higher levels of religiosity) are marked by higher levels of violent crime. We agree with Dawkins and Harris that such data may inform the debate. Nonetheless, these findings are difficult to interpret in view of the "ecological fallacy," the error of drawing inferences regarding individual-level associations (in this case, the relation between religion and violence) from population-level data. It is well-established that this fallacy often (Piantadosi et al. 1988), although by no means always (Schwartz 1994), results in erroneous conclusions regarding the relation between two variables.[3] Because more informative data derive from examinations of the associations between religion and criminal behavior at the individual level, we examine such data next.

Correlational Data

Does religion make good people behave badly? When approaching this question, it is all too easy to "cherry-pick" historical instances in which religion, or the lack thereof, is tied to violent, even horrific, acts. Unquestionably, some of the world's greatest atrocities have been perpetrated in the name of religion. In the opening pages of *The God Delusion*, Dawkins (2006) recites a plethora of examples:

> Imagine, with John Lennon, a world with no religion. Imagine no suicide bombers, no 9/11, no 7/7, no Crusades, no witch-hunts, no Gunpowder Plot, no Indian partition, no Israeli/Palestinian wars, no Serb/Croat/Muslim massacres, no persecution of Jews as "Christ-killers," no Northern Ireland "troubles"… Imagine no Taliban to blow up ancient statues, no public beheadings of blasphemers, no flogging of female skin for the crime of showing an inch of it. (pp. 1–2)

The difficulty with this line of reasoning becomes evident, however, when considering an at least equally lengthy list of historical counterexamples. Even setting aside the contentious question of whether Hitler was inspired by religious doctrine, a topic that falls outside of our expertise to evaluate (see Dawkins 2006 and Evans 2007 for discussions), one can just as readily invoke scores of cases of heinous nonreligious violence on a grand scale. For example, radio–talk show host and political columnist Dennis Prager (2011) contends that ". . . far more people have been murdered—not to mention enslaved and tortured—by secular anti-religious regimes than by all God-based groups in history." In support of this contention, he cites Mao Tse-tung's murder of between forty and seventy million people, Stalin's murder of at least twenty million of his own citizens, Pol Pot's murder of approximately one in four Cambodians, the North Korean regime's slaughter of millions of its citizens, among numerous other examples. It is safe to say that extremism of many kinds, religious or not, can predispose to large-scale violence, especially when conjoined with the deeply entrenched belief that one's enemies are not merely mistaken but deeply evil (Lilienfeld et al. 2009). Whether religious belief makes such hate-fueled aggression more or less likely on average is far from clear.

Indeed, the question of whether religion increases or decreases the risk of genocidal and other large-scale violence may never be answered to our satisfaction. Nevertheless, the more circumscribed question of whether belief in God specifically, and religiosity more generally, are correlated—statistically

associated—with criminal and antisocial behavior, including violence, has been investigated in dozens of studies.

The results of a few early investigations suggested little or no relation between religiosity and crime (e.g., Hirschi and Stark 1969). In contrast, more recent studies, as well as meta-analyses (quantitative syntheses) of the literature, have converged on a consistent conclusion: belief in God bears a statistically significant, albeit relatively weak, association with lower levels of criminal and antisocial behavior, including physical aggression toward others (a statistically significant finding is one that would be extremely unlikely to be observed if the null hypothesis of a zero correlation between the variables were true). For example, in a meta-analysis of sixty studies that yielded seventy-nine correlations, Baier and Wright (2001) found a statistically significant, but weak, negative correlation (r=-.12) between religiosity and crime (correlations range from -1.0 to +1.0, and a correlation with an absolute value of .1 is typically regarded as weak in magnitude). Notably, *all* seventy-nine correlations were negative, although most fell in the range of -.05 to -.20. These findings run counter to Dennett's (2006) claim, seconded by Dawkins (2006), that there is *no* statistical association between religiosity and criminality.

Still, this link appears to be qualified by other variables. The results of several studies suggest that the correlation between religiosity and crime is moderated by attendance at churches or other places of worship, with more frequent attenders being at especially low risk for crime (Ellis 1985; Good and Willoughby 2006). In addition, the diminished risk for aggression and antisocial behavior appears to be more closely associated with intrinsic religiosity, in which individuals view religion as personally important for its own sake (e.g., "I try hard to live all of my life according to my religious beliefs") than with extrinsic religiosity, in which individuals view religion as a means to a personal end (e.g., "The primary purpose of prayer is to gain relief and protection") (Bouchard et al. 1999).

More generally, religiosity is moderately and positively associated with self-control, a trait closely tied to impulse control; again, this association is especially pronounced for people with high levels of intrinsic religiosity (McCullough and Willoughby 2009). In work from our laboratory recently submitted for publication (Lilienfeld et al. 2014), we even found a slight but statistically significant tendency for religious nonbelievers (including professed atheists and agnostics) to report higher levels of certain traits relevant to psychopathic personality (psychopathy), especially weak impulse control and lack of empathy, relative to religious believers. Needless to say, however, the weak magnitude of these associations in no way implies that most atheists are psychopathic, let alone psychopaths.

Other correlational data point to a consistent association between religion and prosocial behavior. For example, in a meta-analysis of forty studies of adolescents, religiosity was moderately and positively associated with prosocial behaviors, such as volunteer work, altruistic acts, and empathic concern toward others (Cheung and Yeung 2011). Broadly mirroring other findings on the intrinsic-extrinsic religiosity distinction, the relation between religiosity and prosocial behavior was most marked for participants with high levels of private (rather than public) religious participation, such as individuals who pray when alone.

In a study of high-school students, Furrow and colleagues (2004) similarly found a strong association between religiosity and prosocial interests, including empathy and a sense of responsibility toward others. Most, although not all, investigators (e.g., Kohlberg 1981) have also reported positive correlations between individuals' religiosity and their level of moral reasoning (Ellis and Peterson 1996), meaning that more religious individuals tend to reason in slightly more sophisticated ways about moral problems compared with nonreligious individuals (although moral reasoning and moral behavior tend to be only moderately correlated; e.g., Stams et al. 2006). Still other investigators have found that unconsciously priming participants by asking them to unscramble sentences containing words relevant to religion (e.g., God, sacred) makes them more financially generous to other subjects compared with unprimed participants (Shariff and Norenzayan 2007). The extent to which these laboratory findings can be generalized to real-world altruism remains to be seen, however.

Belief in God bears a statistically significant, albeit relatively weak, association with lower levels of criminal and antisocial behavior, including physical aggression toward others.

Scholars have proposed numerous causal explanations for the link between religion and moral behavior (see Baier and Wright 2001 for a review). Among these hypotheses are that (a) fear of God's wrath in the afterlife makes believers refrain from unethical actions (the so-called "hellfire hypothesis"); (b) consistent with the generally accepted etymology of the word *religion* as reflecting "tying together," religious beliefs bind individuals more closely to communities, families, and others (social control theory); and (c) religious beliefs foster shame and guilt regarding unethical actions, thereby deterring people from engaging in them (rational choice theory). At the risk of oversim-

plifying an exceedingly large and complex body of literature, we can conclude that there is no definitive or even especially compelling evidence for any of these explanations, although none has been falsified. For example, in a study of 2,616 twins, Kendler and colleagues (2003) reported that a set of items reflecting belief in God as a punitive judge of one's actions was significantly and negatively associated with risk for drinking and drug problems but was not significantly associated with risk for disorders associated with antisocial behavior, thereby offering inconsistent support for the hellfire hypothesis. The authors did find, however, a negative association between general religiosity and antisocial behavior disorders, corroborating the other correlational findings reviewed here.

Caveats

Although extant correlational data are broadly consistent in demonstrating a statistical association between religious belief and (a) decreased levels of antisocial and criminal behavior and (b) heightened levels of prosocial behavior, such findings do not and cannot demonstrate causality (Galen 2012). As statisticians remind us, correlation does not by itself imply causation. Hence, the aforementioned hypotheses regarding the causal effect of religion on moral behavior may be explanations in search of a phenomenon. Authors who interpret these correlational data as demonstrating "the effect of religion on crime" (e.g., Baier and Wright 2001, 3) are therefore going well beyond the available evidence. Moreover, these findings leave us with the at least equally complex question of whether we can generalize from individual-level correlations between religion and crime to the broader implications of religion for society as a whole.

Although the correlational data are consistent with a *potential* causal influence of religion on moral behavior, many other explanations are possible. For example, what statisticians term the *causal arrow* could be reversed: higher levels of moral behavior might contribute to higher levels of religiosity. Longitudinal studies, which track participants over time, may eventually help to adjudicate between these competing hypotheses. The quite limited longitudinal data available thus far are mixed, with some studies finding that changes in people's religiosity predict a lower risk of future delinquency and vice-versa (thereby suggesting a bidirectional relation), but with others finding no association in either direction (Eisenberg et al. 2011). In addition, much of the prosocial behavior exhibited by religious individuals is directed toward other religious individuals, so this behavior could partly reflect what psychologists call "in-group bias (Galen 2012).

Alternatively, one or more "third variables," such as personality traits, could be responsible for the statistical association. For example, religiosity tends to be moderately associated with high levels of agreeableness and conscientiousness (Lodi-Smith and Roberts 2007; McCullough and Willoughby 2009). The literature already reviewed linking religiosity with self-control is consistent with this possibility, as conscientiousness is strongly associated with self-control. Therefore, religiosity *per se* may not contribute directly to higher levels of moral behavior; instead, religiosity may merely be a proxy for personality traits that are themselves related to morality. Indeed, twin data indicate that at least some of the association between religiosity and altruism is in part genetically mediated, meaning that some of the same genes that predispose to religiosity predispose to prosocial behavior (Koenig et al. 2007). These genes may contribute to personality traits that boost the chances of both religiosity and prosocial behavior, although this hypothesis awaits future research.

Another hypothesis is that devout and steadfast adherence to any meaningful worldview, rather than a religious worldview *per se*, is the genuine causal factor. As noted earlier, research points to a robust negative correlation between attendance at religious services and risk for crime. For example, it is possible that one would observe a comparably high correlation among atheists who are regular attendees at meetings of secular humanists. This intriguing hypothesis similarly warrants systematic investigation.

Moreover, even setting aside the crucial issue of causality, the reported correlations are almost always weak or at most moderate in magnitude. Hence, if there is a causal relation between religion and morality, it is most likely either (a) modest in size or (b) large in size but suppressed statistically (masked) by undetermined variables. The middling correlations also tell us that many religious individuals engage in high levels of immoral behavior, and that many nonreligious individuals engage in high levels of moral behavior, a point acknowledged by political and religious commentator Dennis Prager (2013): "None of this [the assertion that God informs morality] means that only believers in God can be good or that atheists cannot be good. There are bad believers and there are good atheists." Furthermore, we are unaware of any data indicating that the relation between religiosity and morality takes the form of a threshold effect, whereby a "critical" level of religiosity is needed to be moral. Hence, we *can* safely answer a different—and widely asked—question with a high level of certainty: "Does one need religion to be moral?" The correlational data permit as close to a definitive answer as one can probably achieve in social science: No. Many nonreligious people clearly exhibit high levels of moral behavior and thinking.

Religion as a Protective Factor against Immoral Behavior

Arguably, somewhat more compelling evidence for a potential causal role for religion in moral behavior derives from studies on the potential *protective* effects of religion on antisocial behavior. In these designs, investigators typically examine individuals at elevated risk for immoral actions,

such as those who possess high levels of personality traits (such as impulsivity) that increase risk for such actions, or those reared in high-crime areas. The hypothesis tested in such studies is what researchers term a *statistical interaction*, which mathematically is a multiplicative rather than additive effect. In more concrete terms, investigators are testing the hypothesis that religion is especially likely to attenuate the risk of antisocial behavior among individuals who are most predisposed to it. This hypothesis carries a certain surface plausibility. Most individuals may not *need* religion to behave morally, but certain individuals—namely, those with potent dispositional or sociocultural predispositions—may need religion as a buffer of "line of last defense" against their antisocial propensities. These may be the very people for whom a moral compass offered by religion is necessary, or at least helpful.

Regrettably, this important hypothesis has been examined in only a handful of studies. Still, the admittedly limited findings are reasonably, although not entirely (Desmond et al. 2013), consistent. In many cases, religious belief appears to play a protective role against antisocial behavior among high-risk individuals. For example, in a study of young adolescents (average age of thirteen), Laird and colleagues (2011) found that the importance of religion to participants was related to a lower risk of rule-breaking behavior, including physical aggression. Notably, this decreased risk was highest among adolescents with low levels of impulse control. Similarly, in a large-sample study of adolescents, investigators found that high levels of religiosity exerted a buffering effect on the risk of alcohol and illicit drug use following negative life events (Wills et al. 2003; see also Bodford and Hussong 2013). In still another study of adolescents and young adults involved in gangs in El Salvador, Salas-Wright and colleagues (2013) reported that both religious coping and spirituality (especially the latter) were tied to lower rates of certain delinquent behaviors, including carrying a weapon, vandalism, and theft. Still, because the authors did not directly test a statistical interaction between risk-status (such as weak versus strong impulse control) and religiosity, the existence of a protective effect in this study can only be inferred indirectly.

Caveats

The results of protective studies are sparse but provocative, and they raise the possibility that religious belief buffers high-risk individuals, such as those who are especially impulsive, against antisocial behavior. Still, as in the case of correlational studies, we cannot be certain that the findings reflect a genuine causal effect of religiosity on diminished risk for antisocial behavior. The apparent protective effect of religion on high-risk individuals could again reflect the indirect effect of unmeasured third variables, such as conscientiousness or devotion to a broader worldview, that are themselves correlated with religiosity. In future research, investigators should incorporate measures of such variables to test rival hypotheses for the buffering effect.

Conclusions

The widely advanced hypothesis that the world would be "better"—more humane—without religion is entirely reasonable, and it should continue to be debated by thoughtful scholars. Contrary to the forceful assertions of some prominent atheist authors (e.g., Dawkins 2006; Dennett 2006), however, the data consistently point to a negative association between religiosity and criminal behavior and a positive association between religiosity and prosocial behavior. Both relations are modest in magnitude and ambiguous with respect to causation. At the same time, they cannot be ignored by partisans on either side of the discussion.

Our bottom-line conclusion is straightforward: any individuals who attach an extremely high level of probability to the answer to the question we have posed are placing opinions over evidence. Blanket assertions by advocates of either position can most charitably be described as scientifically premature. As in all scientific debates, humility in the face of equivocal data should be the watchword.

Moreover, we urge caution in "arguing by example," as many influential scholars have done when addressing this question. One can readily generate compelling historical evidence that seemingly supports the hypothesis that religion makes the world more dangerous (e.g., Dawkins 2006), as well as equally compelling historical evidence that seemingly refutes it (e.g., Prager 2013). One might well suspect that there is some truth to both positions, and that religion may sometimes be a force for good and sometimes a force for evil, depending on the specific religious beliefs, specific individuals, and specific historical contexts involved.

One might well suspect that there is some truth to both positions, and that religion may sometimes be a force for good and sometimes a force for evil, depending on the specific religious beliefs, specific individuals, and specific historical contexts involved.

In evaluating many of the debates concerning this question in the popular media, it is difficult not to be struck by the frequent neglect of the substantial scientific data bearing on it. Neither side has been immune from this tendency. For example, in a piece on the *Huffington Post* blog posted in December of 2013, pastor Rick Henderson wrote, "There is no morally good atheist, because [according to the atheist world view] there really is no objective

morality" (Henderson 2013). Yet this assertion is contradicted by the correlational data we have reviewed, which demonstrate that many nonbelievers engage in high levels of moral behavior.

On the flip side of the coin, take Nobel Prize–winning physicist Steven Weinberg's 1999 assertion, endorsed by Dawkins (2006, p. 249), that "With or without religion, you would have good people doing good things and evil people doing evil things. But for good people to do evil things, that takes religion" (see Lindner 2005). This proposition runs counter to an enormous body of social psychological data demonstrating that many, if not most, good people can be led to perform unethical acts with no religious coercion. For example, in the classic obedience studies of Stanley Milgram (1963; see Burger 2009 for a more recent replication), large proportions of participants were induced by an "experimenter" in a white lab coat (who was actually a confederate of Milgram's) to deliver what they believed to be powerful and potentially deadly electric shocks to another innocent "participant" (who was another confederate of Milgram's). In this study, nary a hint of religious influence was invoked. The purported experimenter carried the banner of the authority of science, not of religion. Interestingly, in the lone study to our knowledge to examine religiosity in the context of the Milgram paradigm, Bock and Warren (1972)[4] found that both extreme religious nonbelievers and extreme religious believers were the least likely to comply with the experimenter's demands to administer shocks; for reasons that are unclear, moderate believers were the most likely. Still, even the small number of nonbelievers delivered more than their share of shocks.

The Bock and Warren study, although limited in size (thirty participants in total), reminds us of how complicated the association between religiosity and moral (and immoral) behavior is likely to be. This link stubbornly resists reduction to simple formulas, probably because it is contingent on a host of still undiscovered factors. In addition, if the results of Bock and Warren's investigation are replicable, they would imply that the relation between religiosity and moral behavior may be sometimes curvilinear or "dose-dependent," further confounding facile efforts to equate religiosity in general with either prosocial or antisocial behavior (Galen 2012).

Some nonbelievers may react to this debate by staking out an alternative position: as scientific thinkers and skeptics, we should be seeking the truth, the consequences be damned. From this perspective, if God does not exist, we should be discouraging uncritical acceptance of religious tenets regardless of whether they exert beneficial or detrimental long-term effects on society. Knowledge, Sir Francis Bacon asserted, is power. In our view, this position is both intellectually consistent and intellectually honest, and we see merit in it. At the same time, advocates of this position need to be forthright in acknowledging that it may entail unknown risks that need to be weighed in public discussions of the value of religion to society.

Other thoughtful readers may object to our article on the grounds that the very question as we and others have framed it is woefully simplistic. According to one frequently cited estimate, there are approximately 4,200 religions in the world (Dekker 2009), with countless subtle differences within many of these belief systems. And surely, individuals apprehend and apply the religious tenets of their chosen faiths in a seemingly endless variety of ways. Making matters more complicated, cultures differ with regard to what behaviors they regard as moral or immoral. For example, although virtually all individuals in all cultures agree that theft and murder should be prohibited, there are sizeable differences of opinion when it comes to certain other activities, such as homosexuality, abortion, and open government protests (Wilson and Herrnstein 1985). Hence, the objection continues, attempting to answer the question of whether "religion in general" makes society "better in general" is a fool's errand.

The point is well taken, and indeed, to the extent that the aforementioned caveats are legitimate, and we suspect that they are, they are all the more reason to insist on humility and circumspection in our claims. Most scientific assertions, especially those in the "softer" sciences of psychology, sociology, and cultural anthropology, possess boundary conditions (Meehl 1978), and it seems implausible that the presence or absence of all religious beliefs would yield similar effects on all societies across all historical periods.

In the meantime, as the debate continues, we exhort readers to emulate the epistemic modesty of our Emory University colleague, primatologist Frans de Waal (2013), who addressed this question with the thoughtful uncertainty that it richly deserves:

> I'm struggling with whether we need religion. . . . Personally I think we can be moral without religion because we probably had morality long before the current religions came along . . . so I am optimistic that religion is not strictly needed. But I cannot be a hundred percent sure because we've never really tried—there is no human society where religion is totally absent so we really have never tried this experiment. ■

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Notes

1. The term *antisocial*, which means "against society," should not be confused with *asocial*, which means "apart" from society. The antisocial person engages in behaviors that harm others, such as criminal acts, whereas the asocial person prefers to have little to do with others.

2. In some cases, this fallacy may stem from a "representativeness heuristic," the tendency to presume that "like goes with like" (Kahneman 2011; see also Gilovich and Savitsky's 1996 article in Skeptical Inquirer). Individuals who perceive that a belief, such as belief in God, reflects a rational judgment may assume that this belief goes along with other positive things, such as more humane treatment of others, and vice versa for people who perceive a belief to be irrational.

3. One widely cited example of the ecological fallacy derives from the work of Robinson (1950), who identified a high correlation between being foreign-born (versus being U.S.-born) and

literacy across the then-forty-eight U.S. states. Yet, when Robinson examined this association at the individual level, the actual correlation was not only much weaker but in the opposite direction: people born in the U.S. had higher levels of literacy. The reason for the fallacious ecological correlation was migration: recent immigrants to the U.S. tended to move to states with higher levels of literacy. That said, an ecological study of crime rates across thirteen nations yielded only mixed support for the Harris/Dawkins hypothesis: countries with higher levels of religiosity tended to exhibit lower levels of property (but not violent) crime (Ellis and Peterson 1996).

4. In an interesting bit of trivia, the study's second author, Neil Clark Warren, later went on to found the religiously inspired online dating site, eHarmony.com.

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The Secular Are Skeptics: The Worldviews of Today's University Students

The 2013 American Religious Identification Survey found there are three distinct worldviews of approximately equal size on today's college campuses: secular, religious, and spiritual. The secular worldview prototype adheres closely to naturalism and Enlightenment ideology.

BARRY A. KOSMIN

The Center for Inquiry's unique brand among the galaxy of freethought and skeptical organizations is its combination of support for both secular humanism and scientific skepticism. Paul Kurtz's visionary formula was to see the harmony and the potential in a worldview committed to "reason, science, and secular values." The logic of history supported him—the secular and scientific revolutions occurred alongside each other during the Age of Enlightenment in the West as they have done in other societies that have subsequently modernized.

Over the past few years, nontheists have been heartened by the findings of national surveys and public opinion polls revealing a growing population of what we call the "Nones," the catchy term for those who claim they have no religion. Two percent of Americans fell into this category in 1957, 7 percent in 1990, and 15 percent in the 2008 American Religious Identification Survey (ARIS), which I directed. This growth trend is mainly fueled by young people, but a key question today is whether this secular younger generation endorses the other side of Kurtz's vision and philosophy, i.e., scientific skepticism. It's crucial to know the answer because today's college students are those same Americans who will soon take positions of leadership in society and in their communities.

This growth trend in "Nones," the catchy term for those who claim they have no religion, is mainly fueled by young people, but a key question today is whether this secular younger generation endorses the other side of Kurtz's vision and philosophy, i.e., scientific skepticism.

To investigate this important issue, last spring the Institute for the Study of Secularism in Society and Culture (ISSSC) undertook an online national survey of college students. CFI partnered as a funder and intellectual contributor to the project. The survey explored the extent of support for both sides of CFI's agenda among today's young adult generation, people born around 1990. The sample of more than 1,800 students were aged eighteen to twenty-nine and attended thirty-eight colleges and universities from across the United States, including both so-called red and blue states. Twelve of the institutions are located in the South, twelve in the Northeast, eight in the West, and six in the Midwest. Fourteen of the colleges and universities are private; twenty-four are public. A random sample of emails was taken from each school's list of students. The sample we obtained is fairly representative of today's four-year college students. Fifty-nine percent of the respondents were women and 28 percent were members of minority groups.

When it comes to their worldviews, 32 percent of the students described themselves as religious; 32 percent said they are spiritual but not religious; and 28 percent said they are secular but not religious. Eight percent offered no answer. Probably the most unexpected and important finding was that college-age Americans are divided among not two but three distinct worldviews: religious, secular, and spiritual. Moreover, each of the three worldviews is attached to

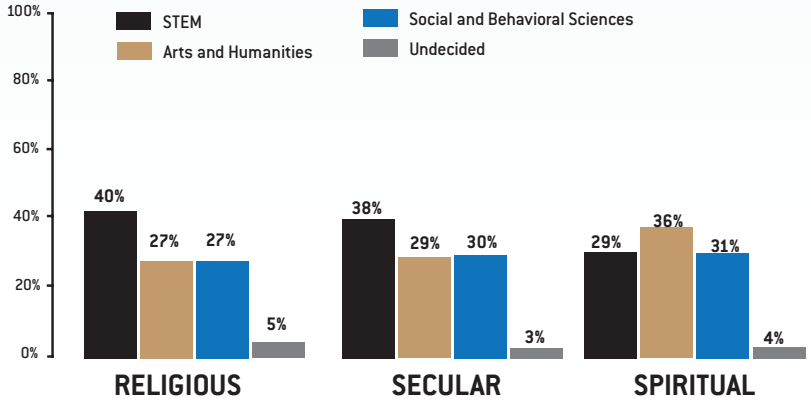
a distinct outlook on theological, philosophical, scientific, public-policy, and political issues. Certainly the secular are now a significant segment of young Americans. Furthermore, as CFI President and CEO Ronald A. Lindsay commented, "It bodes well for the future of science and reason in America that almost one-third of this rising generation identifies as secular, while another third has rejected traditional dogmatic religion."

Our key question or indicator on type of worldview was situated at number 20 in the questionnaire. We did not impose our conceptions or explain what we meant by the three worldview terms. Since the students had to choose their worldview for themselves, the obvious question is did they assign themselves correctly? The answers to the battery of theological questions suggest they placed themselves quite accurately. Patterns of (un)belief in God were remarkably different in each of the three worldviews: The religious group mirrored the general American adult population with 70 percent firm believers and only 2 percent saying they don't believe in God or don't know if there is a God and don't believe there is any way to find out. At the other end of the spectrum were the secular students, who largely provided atheist and agnostic responses to the God question: 77 percent either don't believe in God or don't know if there is a god. Spiritual students exhibited a diverse array of preferences: 27 percent believed in a higher power (but not in a personal god); 24 percent were firm believers; 21 percent believed in God (while having doubts); 12 percent don't know if God exists, and only 5 percent don't believe in God.

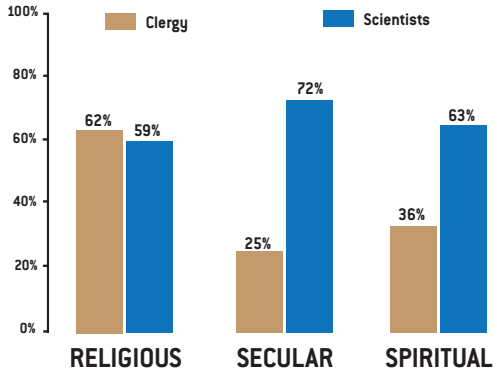
Historically, secularist and skeptic organizations have been found to be male bastions, and somewhat surprisingly this gender imbalance continues even into this egalitarian "coed generation." Gender gaps are noticeable within the secular (with more males) and spiritual (with more females) groups, while the religious group attracts males and females more evenly.

One finding that should interest Skeptical Inquirer readers is the students' views of the ethics and integrity of people in various professions. Overall the students had relatively low opinions of most, except for scientists, who led the way with 64 percent rating them as having "very high" ethics, followed by the clergy, which scored 41 percent. Secular students were of course much more favorable to scientists, but even the religious group rated scientists' honesty and ethics as equal to their clergy.

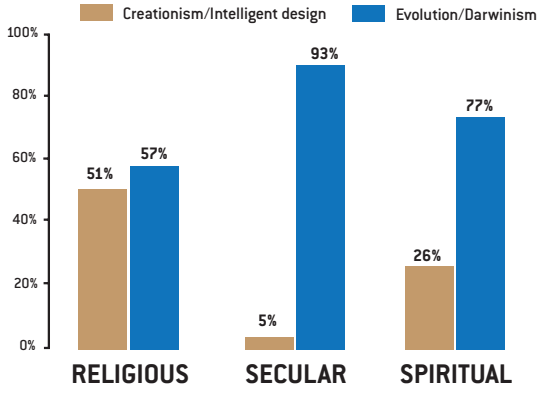
Worldview by College Major



Rating of Honesty and Ethics by Worldview: High and Very High



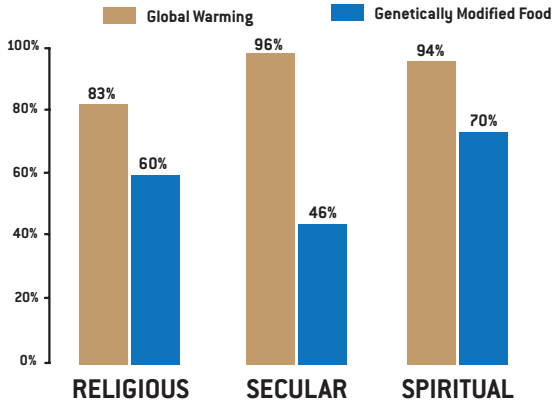
Belief by Worldview



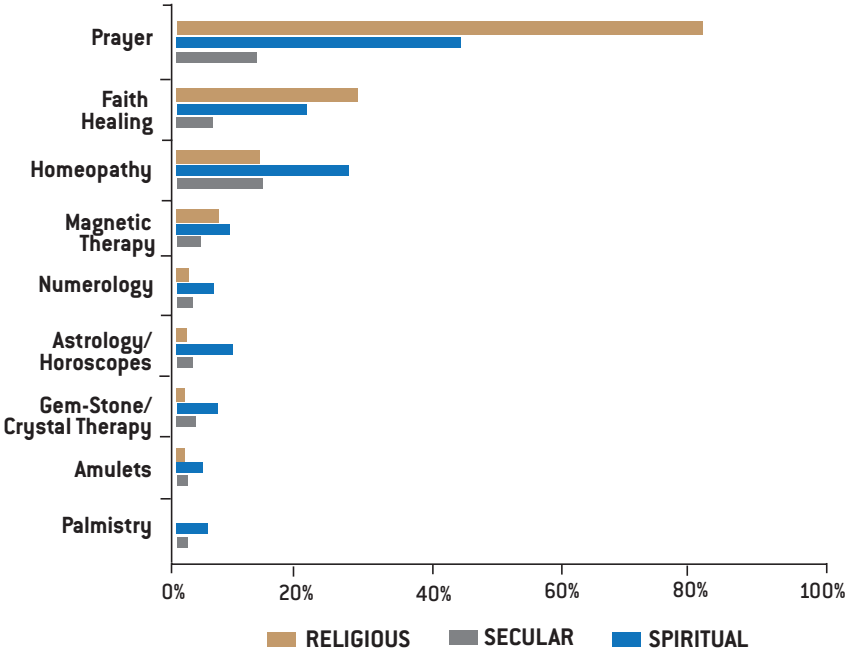
Surprisingly, there were no statistical differences between religious and secular students in choice of majors for study. Students who identify themselves as spiritual were more likely to major in the social and behavioral sciences and were less likely to study science, technology, engineering, and mathematics (STEM). However, this appears to be an artifact of their gender, since women are less likely to study in STEM. This female skew also plays out in many attitudinal variables: women tend to believe more in miracles and in the efficacy of prayer due to their over-representation in the spiritual worldview.

When asked, "Do you believe in miracles?" a strong majority (84 percent) of religious students affirmed their belief in miracles—far more than secular students (13 percent) and more than spiritual students (55 percent).

Concern about Global Warming and GM Food by Worldview



Efficacy of Alternative Practicies/Therapies by Worldview



Secular students, in contrast, were mostly committed to reason and rationalism. When asked, "Do you believe in reason/rationalism?" a strong majority of seculars (83 percent) said "yes"—far more than religious students (63 percent) and somewhat greater than spiritual students (73 percent).

Belief in evolution/Darwinism versus creationism/intelligent design is a wedge issue in American society, challenging religious doctrines and teachings and rattling educational boards around the country. The secular group overwhelmingly endorsed evolution (93 percent) and rejected creationism (only 5 percent said "yes"). A majority (77 percent) of spiritual students believed in evolution but a significant minority (26 percent) believed in creationism or intelligent design. Religious students were split. A majority of religious students believed in creationism/intelligent design, but another majority believed in evolution/Darwinism. Presumably this reflects the split between conservative and liberal religious believers. Yet there was also some confusion in their ranks since 25 percent of religious students somehow believed in both theories. Could this obstruct how science courses are taught and unnerve the environment in science classes?

Students were also asked their opinions on scientific issues that have raised public policy debates, such as whether global warming is a myth and the dangers of genetically modified foods. The questions were phrased thusly: "In your opinion, are the following statements true or untrue? a) Global warming is a myth; b) Genetically modified food is dangerous to our health."

Overall the students were "concerned" by both developments, but the religious group was less worried by both "dangers." The spiritual students were the most worried about GM food. Secular students were overwhelmingly convinced about the reality of global warming but only a minority was worried about GM food.

The issue of the appeal of unscientifically proven traditional and alterna-

Secular Students' Belief about God

		SECULAR
A	I don't believe in God.	41.7%
B	I don't know whether there is a god and I don't believe there is anyway to find out.	35.2%
C	I don't believe believe in a personal god, but I do believe in a higher power.	10.8%.
D	I find myself believing in God some of the time, but not at others.	3.2%
E	While I have doubts, I feel that I do believe in God.	6.1%
F	I know God really exists and I have no doubts about it.	1.1%
	Don't know.	1.9%
	Total	100%

tive therapies and medicine is an issue much debated by skeptics, but there is a shortage of good hard data on the public's attitudes in this area. Since American students today are exposed to many New Age and alternative therapies, we thought it worthwhile to explore. Students were offered the list of items shown in the chart on the bottom of p. 40 and asked: "In your opinion, is there any efficacy in the following practices?"

The pattern of results for the religious worldview reflected the fact that the majority of the group was Christian. A small minority believed in the efficacy of faith healing and homeopathy, which originated in Germany, but they were highly critical of practices regarded as occult.

The secular group, as might be anticipated, was highly skeptical of the efficacy of all the listed items. Interestingly, homeopathy and prayer were least rejected. The spiritual group rated prayer and faith healing lower than the religious, but among this worldview homeopathy outscored faith healing. The spiritual group also tended to have a few more people who embraced alternative therapies.

To appreciate how skeptical the secular students really were, the findings need to be placed in a comparative and global context. Fortunately, at the Institute for the Study of Secularism in Society and Culture, in conjunction with CFI–India, we carried out a path-breaking survey of the worldviews and opinions of a national sample of 1,100 PhD scientists in India in 2008. The Indian scientific elites were found to be much less skeptical than the American secular college students of whom only 38 percent were STEM majors. Among the Indian scientists 50 percent believed in the efficacy of homeopathy and 49 percent in the efficacy of prayer, while faith healing garnered 16 percent. The rest of the scores for alternative therapies and technologies among the Indian scientists largely mirrored the pattern in the chart on the bottom of p. 40 for American students holding the spiritual worldview with astrology (14 percent), magnetic therapy (13 percent), horoscopes (12 percent), and palmistry (10 percent). A positive correlation between religious and esoteric beliefs and beliefs in alternative practices and therapies was perhaps unsurprisingly a feature of worldviews among Indian scientists.

The findings of the ARIS 2013 student survey suggest that three distinct worldviews of approximately equal size can be observed on today's college campuses. Public understanding of the terms matches those of religionists and psychologists. Thus most students can and do fit themselves into one of the three groups, and they seem to agree on what each implies or signifies. This allows us to posit worldview prototypes at least for the current student population. The secular worldview prototype adheres closely to naturalism and Enlightenment ideology with strong support for science, reason, empiricism, and evidence-based medicine. Most ideas that conflict with scientific and rational principles are rejected. Most important, among the three worldviews, the secular worldview group emerges as the most intellectually coherent and unified and with the greatest potential for solidarity. ■

Download the College Student Report at http://www.trincoll.edu/Academics/centers/isssc/Documents/ARIS_2013_College%20Students_Sept_25_final_draft.pdf.

Download Worldviews and Opinions of Indian Scientists Report at http://www.trincoll.edu/Academics/centers/isssc/Pages/default.aspx.

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Faith Healing: Religious Freedom vs. Child Protection

The medical ethics principle of autonomy justifies letting competent adults reject lifesaving medical care for themselves because of their religious beliefs, but it does not extend to rejecting medical care for children.

HARRIET HALL

We have written a lot about people who reject science-based medicine and turn to complementary/alternative medicine (CAM), but what about people who reject the very idea of medical treatment?

Faith healing is widely practiced by Christian Scientists, Pentecostalists, members of the Church of the First Born, the Followers of Christ, and myriad smaller sects. Many of these believers reject all medical treatment in favor of prayer, anointing with oils, and sometimes exorcisms. Some even deny the reality of illness. When they reject medical treatment for their children, they may be guilty of negligence and homicide. Until recently, religious shield laws have protected them from prosecution, but the laws are changing, as are public attitudes. Freedom of religion has come into conflict with the duty of society to protect children.

The right to believe does not extend to the right to endanger the lives of children. A new book by Cameron Stauth (2013), *In the Name of God: The True Story of the Fight to Save Children from Faith-Healing Homicide*, provides the chilling details of the struggle. He is a master storyteller; the book grabs the reader's attention like a fictional thriller and is hard to put down. He is sympathetic to both the perpetrators and the prosecutors of religion-motivated child abuse, and he makes their personalities and their struggles come alive.

Rita Swan: From Christian Scientist to Crusader

Rita and Doug Swan were Christian Scientists who firmly believed that disease was an illusion and that "the most dangerous thing they could do was to show lack of faith in God by relying on medical treatment" (Stauth 2013). (One wonders just how strong their belief was, since when an ovarian cyst caused intractable pain, Rita had surgery to remove it.) When their baby Matthew developed a fever, they paid a Christian Science practitioner to come to their home and pray over him. She told them fever was just fear, and indeed, Matthew recovered.

At the age of sixteen months, Matthew developed a fever again and this time he didn't improve with the practitioner's prayers. Rita and Doug were worried but unwilling to reject the lifelong beliefs that made sense of their lives. Rather than taking Matthew to a doctor, they compromised by calling in a second Christian Science practitioner. The practitioner accused Rita of sabotaging her work with fear, and both parents believed that "defects in their own thoughts" were responsible for Matthew's illness. Eventually they called in a Christian Science "nurse" (trained in metaphysics, not medicine). She did nothing except talk to Rita. Shortly after she left, Matthew began having convulsions. The desperate parents found an escape strategy: they would take Matthew to a doctor with the complaint of a broken bone (something the Church allowed to be treated by a doctor), and would not mention the fever. He was quickly diagnosed with bacterial meningitis and a brain abscess. They had waited too long. Despite intravenous antibiotics and surgery to relieve pressure on the brain, Matthew died.

That happened in 1977. The Swans promptly resigned from the church. They filed a wrongful death lawsuit, but the case was dismissed. Ever since then, Rita Swan has devoted her life to preventing the deaths of other children from faith healing. She founded the Matthew Project, which developed into a foundation called CHILD (Children's Healthcare Is a Legal Duty). She exposed case after case of child abuse that would otherwise have gone unnoticed and reported outbreaks of polio and measles in Christian Science schools and camps. She documented preventable deaths of Christian Science children from meningitis, diabetes, diphtheria, measles, kidney infection, septicemia, cancer, and appendicitis. The Church fought her at every step, but the surrounding publicity only contributed to the ongoing decline in Church membership (they don't announce membership numbers, but the number of U.S. churches has fallen from 1,800 to 900, and by one estimate they have fewer than 50,000 members in the entire world).

As time passed, Rita Swan turned

her attention to similar abuses in other religious sects. A one-woman tornado, she cut a swath across America. She headed a child advocacy organization, published a quarterly newsletter, wrote articles, became a media presence, spoke at conferences on child abuse, lobbied and testified in states where proposed bills would help or hinder her cause, and even moved to Oregon for a time during the campaign to pass effective legislation there. She was eventually instrumental in getting religious shield laws changed in several states.

An Indiana Case

One of the first deaths Rita discovered that was not related to Christian Science was in Indiana. As Stauth tells the story:

> 4-year-old Natali Joy Mudd was found dead by detectives in her own home, with a tumor in her eye that was almost as big as the rest of her head. At the horrific scene, a police sergeant found horizontal trails of blood along the walls of the house. The trails matched the height of the girl's head. Natali had apparently been leaning against the wall as she dragged herself from room to room, blinded, trying to find a way to freedom, before the tumor killed her. (Stauth 2013)

Natali's parents belonged to the Faith Assembly Church, a Pentecostal offshoot. They didn't believe in medical care, and they were not prosecuted because Indiana had strict religious shield laws. Two years later, Natali's five-year-old sister died from an untreated tumor in her stomach the size of a basketball.

The Faith Assembly Church was responsible for as many as 100 childhood deaths and for a maternal childbirth mortality rate that was 870 times the usual rate. The most common cause of death was infant mortality in home births; something that is now rare in Christian Science because it now supports prenatal care and hospital births attended by doctors.

Holding hands, Catherine and Herbert Schaible leave the Criminal Justice Center after a probation hearing May 6, 2013, in Philadelphia. The very religious couple, who were convicted of involuntary manslaughter in the 2009 death of their two-year-old son because they denied him medical care, were in court because their eight-month-old son Brandon died recently under similar circumstances. (Clem Murray/Philadelphia Inquirer/MCT)

The Faith Tabernacle Church

The Faith Tabernacle Church is a sect that has been responsible for deaths from exorcisms in several countries. One believer strangled her five-year-old son to death and kept his body for several days hoping for his resurrection. One couple in Pennsylvania lost six children, all under the age of two, to untreated illnesses. A measles epidemic involving 491 people resulted in the deaths of six children. One couple was prosecuted for letting their sixteen-year-old daughter die of untreated diabetes, but their sentence was only two years' probation and community service at a hospital (and the hospital didn't want them).

The *Pediatrics* Article

In 1998, pediatrician Seth Asser and Rita Swan published an article in the medical journal *Pediatrics* titled "Child Fatalities from Religion-motivated Medical Neglect" (Asser and Swan 1998). They documented 172 faith-healing deaths over a twenty-year period, involving twenty-three different sects in thirty-four states. The true numbers were undoubtedly much higher, since these cases were collected informally rather than systematically and some deaths are never reported. In most of these cases the prognosis would have been excellent with medical care. Asser later characterized some of the cases as babies literally being tortured to death. In one case, a mother died in childbirth after the infant's head had been at the vaginal opening for more than sixteen hours. The infant's corpse was so foul smelling that it was inconceivable that anyone attending the delivery could have not noticed.

In 1988, the American Academy of Pediatrics had called for elimination of religious exemption laws, and in 1983 the federal government had removed religious exemptions from federal mandate; but at the time of the study there were only five states that had no reli-

gious exemptions either to civil abuse and neglect charges or criminal charges.

The Followers of Christ in Oregon

In 1997, twenty years after Matthew Swan's death, a six-year-old boy in Oregon died from a necrotic bowel due to a hernia that could easily have been treated. The pathologist's first reaction was "Not again!" He and his associate had compiled evidence of eighteen children who had died over the last ten years from curable diseases in a Followers of Christ congregation of 1,200 people. That worked out to twenty-six times the usual infant mortality rate. And it wasn't just children: followers' wives were dying in childbirth at 900 times the usual rate. One died of a type of infection that hadn't killed anyone in America since 1910.

There has never actually been a single extraordinary healing among the Followers, only ordinary recoveries from common illnesses; however, that's enough to convince them prayer works—if only their belief is strong enough. Confirmation bias is a powerful thing, and when a child dies the death is considered unavoidable and is attributed to God's will.

Nothing could be done about it, because Oregon had one of the strongest religious shield laws in the country. It protected parents from allegations of religious intolerance and gave them the right to withhold medical care for their children. In fact, the shield had just been beefed up: a new law to increase the punishment for murder by spousal or child abuse specifically prohibited prosecution for manslaughter if the person responsible was acting on religious beliefs.

A TV reporter named Mark Hass was told that there had been a cluster of preventable deaths among the Followers of Christ in Oregon City. He looked into it, but there were no criminal complaints, no police investigations, and the county DA was uninterested. When his investigation seemed to have reached a dead end, someone suggested he visit the local cemetery. He counted the graves of seventy-eight children, far more than expected for a community that size. He launched America's first major series of TV reports on faith-healing abuse on KATU in Portland.

The Psychology of Believers

Even Rita and Doug Swan found it hard to break away from the seductive premise that the power of belief itself could heal, a create-your-own-reality idea that is echoed by Rhonda Byrne in *The Secret* and by a host of other New Age gurus.

The faith-healing sects truly believe they are doing the right thing when they let their children die; they accept it as God's will. Some believers even refuse to wear seat belts. Their inconsistent behavior shows that they tend not to have thought things through very carefully. They hypocritically accept care from eye doctors and dentists. Adults often clandestinely seek medical care for both major and minor medical problems while children don't have that option. In some cases parents saw a doctor for hangnails or mole removal for themselves yet refused to take their child to a doctor for a fatal illness.

Their beliefs come from groupthink and social consensus rather than from reasoned theology or the Bible. Many of them have not read the Bible; when a whistle blower did, he was surprised to learn how much it differed from what he had been taught. They have a supportive, close-knit community and face overwhelming peer pressure. If they resort to medical care, they are shunned by everyone they know and may never see anyone in their family again.

There has never actually been a single extraordinary healing among the Followers, only ordinary recoveries from common illnesses; however, that's enough to convince them prayer works—if only their belief is strong enough. Confirmation bias is a powerful thing, and when a child dies the death is considered unavoidable and is attributed to God's will. An insider said he thought that if a few Followers were punished, the rest would rationalize that going to doctors was okay after all and would come up with a new doctrine. He thought most of them would be happy to change if everybody else did. When courts have ordered blood transfusions for the children of Jehovah's Witnesses, they have sometimes seemed more concerned about what their co-religionists would think than about the religious implications of the transfusion itself.

Progress in Legislation

The first state to repeal a religious shield law was South Dakota. Then CHILD won a federal lawsuit in Minnesota, arguing that taxpayers should not be required to subsidize Medicare and Medicaid payments for Christian Science nursing. Unfortunately, Senator Orrin Hatch negated their win by getting a new law passed that provided for Medicare payment for "religious non-medical health care." CHILD sued again but this time they lost. In 1999, a compromise bill was passed in Oregon eliminating religious shields for murder by abuse, murder by neglect, first- and second-degree manslaughter, and criminal mistreatment. After this, no followers died of medical neglect for the next five years, and there were major modifications in the shield laws in several other states.

Examples of Prosecutions

Josef Smith, eight years old, was beaten to death during an exorcism in Tennessee. His parents, members of the Remnant Fellowship, were found guilty of murder and sentenced to life in prison plus thirty years.

A mother who beat and smothered her child was sentenced to life in prison for first-degree murder. She gladly accepted her punishment as part of God's plan.

The people who starved a sixteen-month-old to death for failing to say "Amen" and then absconded with his corpse in a suitcase were sentenced to fifty years each for second-degree murder.

Eighteen-month-old Alayna Wyland nearly went blind from an untreated enlarging hemangioma that obstructed her left eye. She was rescued just in time for pediatric ophthalmologists to save her eyesight, and her parents were tried for first-degree criminal mistreatment of their child. They got ninety days in jail and three years' probation.

A test case was needed in Oregon, but DAs were reluctant to prosecute, and even church members who no longer approved of their own churches were too frightened to provide inside information. Finally Patrick Robbins turned whistle blower after the death of his newborn baby led him to doubt the teachings of the Church. His assistance led to several prosecutions.

In 2008, fifteen-month-old Ava Worthington died from a softball-sized lump on her neck that obstructed her breathing and caused pneumonia. Investigation of the case was difficult, because witnesses denied having observed any signs that the child was in distress. Her parents were the first to be tried under the revised 1999 law. The jury was sympathetic to the parents. The father was convicted of misdemeanor criminal mistreatment but not of manslaughter; he spent two months in jail. The mother was found not guilty.

The Beagleys were convicted of criminally negligent homicide in the death of their sixteen-year-old son Neal for complications of a congenital urinary tract anomaly that could have easily been repaired. They each served sixteen months (consecutively, so one of them was always home to care for their other children).

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These are tragic cases. No one likes to see children taken away from their parents, and these parents loved their children and truly believed they were doing the right thing. They were victims too.

Oregon's 2011 Law

The Oregon 1999 compromise bill was not enough; it had repealed five of the nine religious shield exemptions but left four others in place. After five years without a death, three more Followers' children died in 2008 and 2009. In 2011, after extensive lobbying by Rita Swan and others, Oregon passed a new law to eliminate religious beliefs entirely as a legal defense and allow prosecutors to seek murder charges against parents who deny their children medical care for religious reasons. There are only five other states with no religious exemptions for sick and injured children: Hawaii, Nebraska, Massachusetts, Maryland, and North Carolina.

But Oregon law still allows religious

The religious exemption for bicycle helmets is particularly puzzling: where in the Bible does it say "Thou shalt not wear bicycle helmets" or even "Thou shalt take no precautions against injury"? The reasoning seems to be that if God wants a child to die from a head injury, we shouldn't get in his way.

exemptions for caregivers of dependent adults, and it still allows religious exemptions for immunizations, metabolic screening (for conditions like PKU), newborn hearing screening, vitamin K and prophylactic eye drops for newborns, and bicycle helmets. Ashland, Oregon, has the highest school vaccine exemption rate of any U.S. city; in one school in Eugene, 76 percent of students had rejected one or more vaccines for religious reasons. The religious exemption for bicycle helmets is particularly puzzling: where in the Bible does it say "Thou shalt not wear bicycle helmets" or even "Thou shalt take no precautions against injury"? The reasoning seems to be that if God wants a child to die from a head injury, we shouldn't get in his way.

The Oregon law is being enforced. Later in the very year the law was passed, 2011, Dale and Shannon Hickman were found guilty of second degree manslaughter in the death of their infant son, prematurely born at home with only unqualified midwives in attendance. They were sentenced to six years and three months in jail, followed by three years supervised probation.

The Tide Turns

A few months later, when Oregon members of the Church of the First Born were accused of negligent homicide for the death of their son from a treatable condition, they didn't even try to fight but pled guilty. They agreed to provide medical care for their other children and were sentenced to probation with close monitoring.

Some members of the Followers of Christ sect were starting to accept medical treatment and even wondering what all the fuss had been about.

In Philadelphia, Herbert and Catherine Schaible were put on ten years' probation after their two-year-old died of untreated bacterial pneumonia. The terms of their probation required them to purchase medical insurance and put their other children under the care of a pediatrician. They callously disregarded the terms of probation and their eight-month-old son died of untreated bacterial pneumonia when they failed to seek medical care for him. They were charged with third-degree murder, involuntary manslaughter, conspiracy, and endangerment. They were jailed and denied bail because the judge feared their co-religionists might hide them in other parts of the country. They pled "no contest." Their pastor said the father "…knows he has to obey God rather than man." He said the children died because of the parents' "spiritual lack."

Following the Followers to Idaho

Investigative reporter Dan Tilkin of KATU News covered the Oregon court cases, and he has recently reported on ten more dead children of the Followers of Christ in Idaho, where religious shield laws are still in place. Of the marked graves in the Peaceful Valley Cemetery, more than 25 percent are children. Sadly, his report ends by saying, "No significant move to change the laws is underway" (Tilkin and Lane 2013).

Conclusion

The medical ethics principle of autonomy justifies letting competent adults reject lifesaving medical care for themselves because of their religious beliefs, but it does not extend to rejecting medical care for children. Society has a duty to override parents' wishes when necessary to protect children from harm. It is not uncommon for the courts to order life-saving blood transfusions for the children of Jehovah's Witnesses or cancer treatment against parents' wishes. But thirty states still have religious shield laws, and every state but Mississippi and West Virginia allows religious and/or philosophical exemptions for school vaccination requirements. Those laws should be repealed. The Affordable Care Act ("Obamacare") requires insurance companies to cover "nonmedical" health care such as prayers by Christian Science practitioners. That provision should be removed.

It has been argued that most of the increase in human lifespan is due to advances in hygiene rather than to advances in medicine. The estimates of a twenty-six-fold increase in infant mortality and a 900-fold increase in maternal mortality among the untreated Followers of Christ demonstrate just how valuable modern medical care really is.

Another valuable source is available free online: the newsletter archives of CHILD (Children's Healthcare Is a Legal Duty, http://childrenshealthcare.org). It describes many more tragic cases of children who have been harmed or have died from religion-motivated child abuse and neglect. ■

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Modern Witch Hunting and Superstitious Murder in India

The modern practice of witch hunting in India includes violence and beliefs that have led to the torture and murder of alleged witches. State governments and rationalist groups are trying to address the problem but face big obstacles.

RYAN SHAFFER

When Americans think of burning witches, they often consider it a metaphor or historical event from hundreds of years ago. Yet in many parts of the world, elderly widows live in fear of being killed as "witches" when a neighbor becomes ill or livestock die unexpectedly. India represents a modern-day paradox. On the one hand, it is the largest democracy in the world and has a rapidly growing economy. On the other, most of the population remains poor, and Indians, both educated and not, often turn to superstition to cure illness, find love, and rationalize bad events. This modern superstition has deadly consequences reminiscent of the witchcraft craze in America. In India, a person accused of being a "dayan" or witch can be tortured, raped, hacked to death, or burned alive. Victims are often single older women, usually widows, but they can also be males or children.

A 2002 *Skeptical Briefs* report (Vijayam 2002) detailed a team of medical doctors, magicians, and social workers who conducted educational outreach in rural Indian villages to prevent violence spawned by belief in witchcraft. Despite such efforts, superstitious belief in witchcraft continues to plague parts of India, resulting in injury or death. The Indian government's most recent data shows that 119 people were killed with witchcraft being the "motivation" in 2012. According to the *Times of India*, a National Crime Records Bureau report revealed that more than 1,700 women were murdered for witchcraft between 1991 and 2010. The numbers are undoubtedly actually higher, as many cases go unreported or authorities refuse to register the cases.

Dimbeswari Bhattarai, a witch doctor, or ojha, speaks during an interview with Reuters in Uttarkuchi village in India's northeastern state of Assam, September 7, 2006. Police say that around 300 people have been killed in the state in the past five years for allegedly practicing witchcraft.

Allegations of witchcraft that result in communal murder have long been a part of rural India's history. Scholar Ajay Skaria, for instance, explored the torture and murder of women who were accused of being witches in British India. This practice has continued, though with irregularity, into the present. A 2013 *Al Jazeera* documentary explored the lives of women who were accused of practicing witchcraft. For those who are lucky enough to live after the accusations, they often are forced to move to a new area without resources to start their lives over. Many of the accusations have roots in property disputes, local politics, and disease, which then develop into allegations of witchcraft and then to violence. In recent years, there has been a concentrated effort to help women who fled their villages because of persecution. But according to *Al Jazeera*, there are only three Indian states that have legislation to address accusations of witchcraft.

One state government that passed legislation is Jharkhand, a state in Eastern India that is ranked twen-

ty-five out of twenty-eight in literacy. The state is famous for an indigenous religion called *Sarna*, derived from oral tradition, which does not treat women equally to men. Compounded with women being second-class citizens, single women, especially widows, are the targets of witchcraft accusations. In 2001, the Jharkhand government passed the Dayan Pratha (Prevention of Witch Practices) Act to protect women from inhumane treatment and give victims legal recourse to abuse. Some people have described witch hunting as a "common" phenomenon in the state, and the law has not eliminated the practice.

In the last two years, there have been several notable murders involving allegations of witchcraft. In 2012, four people were murdered in about a month's span in Jharkhand.

In the last two years, there have been several notable murders involving allegations of witchcraft. In 2012, four people were murdered in about a month's span in Jharkhand. If the suspects are convicted of breaking the Dayan Pratha law, they will face a longer prison sentence than if they just committed murder. Bimla Pradhan, Jharkhand's social welfare minister, said the government has funded an awareness campaign to end the superstition that "has led to atrocities against women" ("Witchcraft Claims Lives" 2012). Nevertheless, in November 2013, a mother and daughter in Jharkhand were pulled out of their home by villagers who took them to a nearby forest and slit their throats. After the mother's husband died years before, rumors began that the women were witches, and villagers blamed the women for several children becoming ill. Regarding the murders, police said: "All I can say is the women seem to have been killed for witchcraft" (Mishra 2013).

Rajasthan is a unique state in India because it is not only the largest but also shares a border with Pakistan. In the last few years, the government passed the Rajasthan Women (Prevention and Protection from Atrocities) Bill that makes it illegal to call a woman a "dayan" or accuse a woman of performing witchcraft that leads to harm. A guilty person can be sentenced to a maximum of three years in prison. If a woman is driven to commit suicide because of witchcraft accusations, the accuser can receive a fine and ten years in prison. The law came in response to decades of assaults, including branding the faces of women accused of witchcraft. According to *The New York Times*, "The mixing of old superstitions with modern material desires has proved deadly for these women, as many brandings are now done to disinherit them from family property" (Sharma 2012).

Witchcraft and murder is not isolated to these regions of India. A group of villagers in rural Odisha, a state on the East Coast, assaulted and forced three people, including two women, to walk naked through the village. In November 2013, a boy was killed in the same state and police arrested two people accused of the murder for killing him "for the purpose of human sacrifice" ("Boy Killed for Witchcraft" 2013). In 2005, Chhattisgarh, a state in central India, passed the Witchcraft Atrocities Prevention Act to stop the violence and murder. Most recently, in rural Chhattisgarh, two women in their fifties were killed by three boys. According to police, the father of one boy was ill and the other two boys' fathers were dead. Believing the women were to blame, they "questioned those women about their involvement in witchcraft practices, but they refused to speak. This infuriated the boys who first strangled them and later slit their throats" (Drolia 2013). In 2011, a mother and daughter were accused of being witches in Assam, but police later discovered the accusations were used as a pretext for their rape. According to the Assam government, between 2006 to 2012 there were 105 "witch-hunting" cases with the government planning legislation to curb the violence (Pandey 2013).

With communal violence, a witness to the abuse or murder does not stop the act from taking place. In many instances, groups of villagers are involved in attacking "witches." Neither the laws nor the presence of journalists have been able to prevent witch hunting. In 2008, a woman was hired by a man to use magic to improve his ill wife's health. When his wife's condition worsened he began beating the woman, and five other locals joined in the abuse. She was tied to a tree, and she was slapped repeatedly and had her hair cut as a journalist filmed the events. The cameraperson decided not to attempt to stop the act and filmed it before calling police.

Women are not the only victims in witch hunts. In July 2012, an elderly man and his wife were forced to ingest human urine and excrement in Jharkhand. The two were accused of practicing witchcraft, which supposedly resulted in the death of local livestock. One month later in another village in the state, a man was pulled from his house and buried alive for allegedly practicing witchcraft. In 2013, an elderly man was forced to eat human excrement in Meghalaya, a state in northern India. He was accused of practicing witchcraft when four girls became sick and started having dreams about snakes. The villagers gathered together and decided on his punishment. The assistant village chief defended the action, saying after the event the girls' health improved.

There is no easy solution to stopping these witch hunts. Groups from all walks of life have attempted to stop the violence. A group of self-proclaimed witches planned to protect women by boarding a boat in Mumbai (Bombay) to send "positive energy" on

October 31, 2013. However, Indian rationalists and women's rights activists have pushed for more concrete efforts. Though they have sought stricter laws to punish violence stemming from witchcraft allegations, several groups want to change perceptions toward women and supernatural belief. Indeed, legislation is not a cure for superstition; improving critical thinking is the key.

Changing attitudes includes exposing fraud and teaching critical thinking about superstition, which sometimes runs counter to long-held indigenous beliefs. Outside intervention in rural communities is frowned upon, and rationalists face difficultly in winning support from people with heavily ingrained beliefs. The Rural Litigation and Entitlement Kendra (RLEK) has been fighting for voting rights, education, and ending bonded labor throughout India. Recently, it has taken an interest in stopping witch hunts through literacy programs in which women directly voiced their complaints to judges and state officials in attendance. The Indian Rationalist Association, which has more than 100,000 members, engages in rural outreach that teaches critical thinking and exposes superstition. While it is difficult or impossible to rid the world of magical thinking and superstition, there are many underfunded groups trying to end modern witch hunts that continue to plague remote parts of India. ■

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Raelism: Christianity for the Space Age

Raelism is the world's premier UFO religion. Involving extraterrestrials, telepathy, antigravity beams, Noah's spaceship, and an ancient nuclear holocaust, it is a souped-up form of Christianity that claims to be in sync with modern science—but in fact denies it.

MARK RUBINSTEIN

Wikipedia lists fifty-nine religions that were created between 1970 and 2007. Raelism, one of the most fascinating, was founded in 1974 by Claude Vorilhon (rechristened as Rael, "messenger" in Hebrew), a former automobile journalist and race-car driver. Today, with a self-reported 85,000 members, it is proudly the world's premier UFO religion.

In the year of its founding, Rael published the scripture of the new faith with the forthright title, *The Book Which Tells the Truth*.[1] It relates what Rael says he learned on December 13, 1973, from extraterrestrials who descended to Earth that day in a flying saucer. The aliens, who call themselves "the Elohim," revealed to Rael that they come from a planet about one light-year away. The people of Earth need to understand their true origins: this was not their first trip here; 25,000 years ago the Elohim designed humans in their image and planted them on Earth, along with all other terrestrial life. This is an example of "directed panspermia," which postulates that life on Earth derives from the intentional intervention of an advanced extraterrestrial civilization. Francis Crick and Leslie Orgel, in their article "Directed Panspermia," *Icarus* 19, 1973, pp. 341–346, describe a sophisticated version of this idea: our planet was not seeded by a visit of extraterrestrials themselves bringing human beings fully formed (as Rael claims) but rather with microorganisms sent billions of years ago by a civilization many light-years away.

This August 2002 photo shows "Rael," the former French journalist Claude Vorilhon, the founder of the "Raelian Revolution," delivering a speech at a conference in Tokyo.
AFP PHOTO/TOSHIFIUMI KITAMURA/FILES

The similarities to Christianity are manifold. Rael was adopted by the Elohim as humankind's prophet and had an epoch "second encounter" about two years later when he was taken to their home planet. Jesus is seen as an early messiah whose mission is to be completed by Rael, the last messiah, who has come to prepare humanity for the *imminent* return to Earth of the Elohim. Rael quotes Christian scripture (p. 324): "This generation shall not pass till all these things be fulfilled" (Matthew 24:34). At that time, there will be a last judgment of individual men and women. Those who have followed Rael will live eternally in bliss, while others will be destroyed. Raelian scripture reads: "The former [goats] will undergo the suffering and destruction in the final furnace, and the latter [sheep] will be spared and taken with the Guide of Guides [Rael] to the planet of the eternals" (Rael, p. 217; compare to Matthew 25:31–46).

In the meantime, the new scripture warns against theists and evolutionists and other false prophets:

> Woe to those claiming to have met the Elohim or to have received a message from them if it is not true. . . . . Also those who act against the Guide of Guides . . . Without any obvious influence coming from above, they will know why disease, family and professional difficulties, emotional woes and other problems will all invade their earthly existence while they await their eternal punishment. You who smile as you read these lines, you are among those who would have crucified Jesus if you had lived in his time. (Rael, p. 215; compare to Matthew 23:1–39)

The scripture must be accepted even if, as Rael acknowledges, there is no physical evidence yet (apart from his testimony) of the Elohim or their planet (p. 103). As Jesus concurs, those who believe without evidence will be held in even higher esteem than those who believe from evidence (compare to John 20:29). Similar to Romans (1:20), once you are acquainted with Raelian scripture, there are no excuses for not believing. As Jesus does for himself (John 14:6), the Elohim declare Rael to be "the Way, the Truth, the Life" (p. 360). In their final message to Earth, the Elohim promise that "the hour of our Great Return is near" (p. 360), just as Revelation, the last book of the Bible, proclaims in its penultimate verse, "Surely, I [Jesus] come quickly."

Raelism shares with other messianic faiths such as Christianity this inherent difficulty: Why the messenger or the messiah? Why should the key to earning the reward be the strange requirement of believing Jesus or Rael is the messiah? If it were just a matter of selecting out the good from the bad, why is such a test necessary? Why doesn't God or the Elohim, who already know who is good and bad, just dispense justice and get it over with? In my view, we still await a satisfactory answer. In the meantime, isn't it just a little suspicious that the very man who explains this is the same man or semidivine being that followers are supposed to revere?

But Raelian scripture gives a unique answer: when the Elohim land on Earth and make themselves generally known, they need assurance that people will not misunderstand, attack them on the ground with their military, and send war planes to shoot their spacecraft out of the sky (p. 90). But how could the Elohim with a supposed lead of 25,000 years of technology—including the ability to fly across the galaxy at faster-than-light speed and monitor the thoughts of human beings by mental telepathy—seriously be concerned about the danger to their own welfare?

The alternative Raelian symbol, which doesn't have a swastika, was adopted in 1991 to help diplomacy with the state of Israel.

Raelism shares with other messianic faiths such as Christianity this inherent difficulty: Why should the key to earning the reward be the strange requirement of believing Jesus or Rael is the messiah?

What could they do instead to introduce themselves? Here is what I think they should do: Begin by remaining a respectful distance above Earth. Engage a marketing professional. Give presents to each person on Earth, say a teddy bear that can talk, and explain Raelian scripture to the common man. In the spirit of the miracles of Jesus, give some hint of the new technologies the Elohim will be gifting to the people of Earth. Then over several weeks, put on a most amazing fireworks display and light show that would put Disneyland to shame. What do they do instead? They select a single man clearly not up to the task, with little in his background to recommend him, who for forty years more or less fails to convince people of the Elohim's message, and do *everything* though him!

Finding Jesus in the Hebrew Bible was an early Christian industry, known today as "typology," which has been used by Christians as the key proof that the Bible must be true. Similarly, like the New Testament, which uses the Hebrew Bible to establish its authenticity, the new scripture relies on the Bible (both the Old and New Testaments). The game is to show that the Bible, though finished about 2,000 years ago, is flooded with indications of the Elohim, their intervention in human history, and their plans for humanity. This "proves" that Raelian scripture must be true. However, right off, Rael cautions that much of the Bible is "poetic bab-

blings" and to pay attention only to the parts he is decoding (p. 11). If, as Rael claims, the Elohim have used the Bible to hint about their existence, one wonders why they have taken such an odd way to go about it: bury a few truths in a mire of nonsense and trust that mankind will eventually find them.

Have you ever wondered how Jesus became illuminated during the transfiguration as witnessed by Peter, James, and John (Matthew 17:1–8)? Answer: by the powerful searchlights of a hovering alien spacecraft (p. 74). This just gets us started.

We learn that the word *God* in the first verse of Genesis, "In the beginning, God created the heaven and the earth," is actually in Hebrew, "Elohim," which means "those [plural] who came from the sky" (p. 11). The second verse, "And the spirit of God moved upon the face of the waters," as Rael assures us, refers to the Elohim, who first came to Earth to seed the human species at a time when water and a thick mist completely covered the land (p. 11). Genesis continues, "And God saw the light, that it was good." According to Rael, the Elohim first checked that the sun was heating Earth properly and were pleased to find it was not sending hurtful rays, so its light was good (p. 12). Unfortunately, as time went by, the Elohim soon found great evil on Earth as its people tried to "become scientific and equal to their creators" (p. 20). So the Elohim exploded nuclear missiles they had sent to Earth, which created a gigantic tidal wave that covered its surface. Noah and his family alone were selected to survive—not in a boat (that is just an old wives' tale, and a boat would not have worked anyway), but rather in a spaceship that Noah had built that orbited above Earth during the crisis. After all, if the Bible had said "spaceship," no one in ancient times would have known what that meant (pp. 18–22). But this explains the hint left by the Elohim in Genesis (7:17), targeted for future generations that till now you may have missed: "It [the ark] was lift *up above* the earth" (p. 20, emphasis added). I know the Bible says humans built a tower called Babel to reach the heavens (Genesis 11:1–9) (another old wives' tale), but did you know the science of their day was much more advanced than it is now? What the Elohim objected to was the rocket ship that those brainy Jews had built that was to be targeted for their planet—even though it was one light-year away (p. 22). Shame on those upstart Jews! If you have ever wondered why they ended up scattered over the world (the Diaspora), that was to prevent them from cooperating again to rebuild the rocket (p. 23). There is, however, another problem here: according to the Bible, there were no Jews at this time; they came later with the story of Abraham.

Moving quickly forward, how did the miracle of the parting of the Red Sea occur? Actually, it was not a miracle but was instead caused by the repulsion ray invented by the Elohim (p. 32). I'll bet you didn't know that Jesus was able to walk on water because he used an antigravity beam that the Elohim had developed (p. 73). Have you ever wondered how Jesus became illuminated during the transfiguration as witnessed by Peter, James, and John (Matthew 17:1–8)? Answer: by the powerful searchlights of a hovering alien spacecraft (p. 74). This just gets us started. For other staggering new explications of biblical verses, I encourage you to sample what takes up most of Rael's original scripture (pp. 10–88).

Like Matthew's forced attempt to find mention of the virginity of Mary in the Hebrew Bible (Isaiah 7:14), Rael, who usually quotes verbatim from the King James Version (except for replacing "God" with "Elohim" and "the Lord" with "Yahweh"), strains to find mention of UFOs: "And I looked, and, behold, a whirlwind came out of the north, a great cloud, and a fire enfolding itself, and a brightness was about it, and out the midst thereof as *the color of amber*, out of the midst of the fire. (Ezekiel 1:4, emphasis added).

But this time without telling us himself, Rael suddenly quotes from a different version of the Bible (a version that seems to have been used at *only* this point) that replaces the phrase "the color of amber" with "glowing metal," which for the modern reader leaves a quite different impression.

Raelism appeals to those who are troubled by contradictions between science and religion. It seems to reconcile these two approaches to understanding the world. It shows how the Bible may be interpreted without recourse to the supernatural. The method is simple and consistent: Raelism replaces an immaterial god with material extraterrestrials who, through advanced technology, have accumulated much of the power that Christianity attributes to God. Miracles don't happen but, to paraphrase Arthur C. Clarke, to a primitive species like humans, they cannot be distinguished from advanced technology (p. 73). Besides the repulsion ray and antigravity beam already mentioned, the Elohim are also helped by refrigeration rays (p. 52), paralyzing beams (p. 53), and flying suits (p. 56). As if its supposition were true, the new scripture asks rhetorically: "How can you not believe in all this now that [modern] *science* and ancient *religions*

are coming together perfectly?" (Rael, p. 215, emphasis added).

Raelism claims to embrace science, saying that it "is the most important thing for all of humanity" (p. 205). But its scriptures:

- advocate much-faster-than-light space travel (p. 159) (physics);
- claim the existence of a single supercontinent on Earth just 25,000 years ago (pp. 12–13) (geology);
- date the simultaneous creation of all current species on Earth as well as dinosaurs (who may later have died off in the Great Flood) to about 25,000 BCE; discarded "pre-historic" humanoids were failed early experiments (p. 93) (biology);
- claim the nearest star to Earth (the Elohim's home) is one light-year away (p. 88–89, 234) (astronomy);
- say humans were created by the Elohim in their image, the Elohim in turn were created by older intelligent life, these in turn were created by even older intelligent life … off to infinity (p. 15, 252–253) (cosmology);
- claim carbon-14 dating falsely assumes a constant rate of decay (p. 235) (paleontology);
- describe a worldwide nuclear holocaust that destroyed almost all life on Earth about 25,000 years ago (p. 20) (paleontology);
- claim that prayer works by mental telepathy even though the world is completely material (pp. 172, 199–200, 209–13); what is more, don't shave any of your hair because it interferes with your telepathic transmitters; look what happened to poor Samson (pp. 35–36) (neurology);
- claim that the exodus of Jewish slaves from Egypt more or less as described in the Bible is a true historical event (pp. 26–32, 176) (archaeology); and
- intelligent life, indeed whole universes, exist within each atom, just as our planets and stars are the atoms of larger beings (pp. 153–54) (physics).

All these claims fly in the face of modern scientific knowledge. So Rael throws out much of science nonscientifically—without presenting real proof or evidence. In the end, rather than embrace modern science as it pretends, Raelism denies it.

Rael seems to get some of what the Elohim have told him wrong. He claims that, according to the Elohim, democracy on Earth first emerged in France (p. 8), instead of classical Greece or the United States. Did I mention that Rael is French? Rael says that the theory of evolution claims humanity is descendant from monkeys (pp. 92, 315), when in fact evolutionary biologists say man and monkeys share a common ancestor. Rael says that evolution, since it leads from simplicity to complexity, must violate the law of entropy (the second law of thermodynamics) and therefore cannot happen. This is a common objection to evolution, but it fails to notice that the law of entropy applies only to the *net* behavior of a *closed* system—otherwise explain how a cathedral could ever get built out of individual stones. Finally, the Elohim seem not to understand how the universe can be finite and yet have no center (pp. 154, 245).

Religion can appear intellectually attractive because it "explains" everything (and the most important part of "everything" is what science has yet to explain). Saying that "God did it" has a way of covering the landscape. But this comes at a steep price. Unlike scientific theories that must be refutable, religion is generally not. For example, if the sun seems to orbit Earth in a particular way, the religion says that happens because of a "miracle," that is, an invisible god pushes it. How could that statement be refuted? Just because science discovers a rule that with great precision has always predicted where the sun will be in the sky does not mean that the invisible god was not responsible for its movement. You can see how religion has an unfair advantage. Gods tend to have no limitations, so religion not only explains *everything* that did happen; it explains *anything* that could have happened. A scientific theory, in contrast, makes a specific and narrow prediction, the perfect setup to allow refutation. Despite superficial appearances, Raelism is not immune from the problem of refutability. It simply substitutes "advanced and secret alien technology" for "miracle."

Religion can appear intellectually attractive because it "explains" everything (and the most important part of "everything" is what science has yet to explain). Saying that "God did it" has a way of covering the landscape. But this comes at a steep price. Unlike scientific theories that must be refutable, religion is generally not.

There is, however, one way to definitively refute religion. If the religion commits itself narrowly, like science, to a prediction of some event in the *future* that science does not predict, then it offers a way to test it. So when the biblical Jesus predicts he will return within a few decades and that does not happen, then, as his followers originally conceived Christianity, it must be false.

As with Christianity, an obvious way to test a new religion is to see if, when it commits itself, the prediction of a future event comes true. Even

the Bible recommends this technique (Deuteronomy 18:17–22). How well is Raelism doing? So far, apparently, after forty years, no one has seen the Elohim apart from Rael. Despite his prediction of their imminent return, nothing has happened. In 1974, both Rael and the Elohim (according to Rael), predicted an upsurge in sightings (pp. 103, 115, 117) reminiscent of Jesus (Mark 13:35–37). Instead sightings have diminished as UFOs have gone out of fashion, a far cry from the publicity they received in the glory years of the late 1940s through the 1970s.

Despite these concerns, many people may still be tempted to convert. But before you do, in the interests of full disclosure, here are some of Rael's other claims that might influence you:

- He says when he visited the Elohim's planet, in the spirit of eclecticism, he talked with the great prophets of old, including Moses, Elijah, Buddha, Jesus, and Muhammad (p. 165).
- He says he was *conceived* on Christmas day, 1945 (p. 123). Nine months later or so, Rael was born on September 25, 1946, an epoch turning point in human history, separating the Age of Pisces from the Age of Aquarius (p. 81). The calendar must now be reset to begin each year on the date of the birth of Rael (p. 206). Therefore, 1946 will henceforth be year 1.
- Rael first admits that he doesn't know anything about his father (p. 123). It seems his mother gave birth out of wedlock (p. 124). But he learns from the Elohim in a touching scene that his father is an extraterrestrial named "Yahweh" (p. 290) who also goes by the name "Allah" (p. 165). Rael seems to have been "sent" by Yahweh to save the human species from self-destruction. It was no accident or coincidence that Rael was conceived just months after August 6, 1945, the day an atomic bomb was dropped on Hiroshima (p. 290). Like Jesus, then, Rael has come to save the world from itself, and, like Jesus, he begins his mission at about thirty years of age.
- Rael castigates the Vatican for its extreme wealth and luxury but commands that his followers give all their wealth at death (with the exception of their houses) to the "Guide of Guides," who it turns out is none other than Rael himself (p. 192). Right now, his followers are being asked to give money so that he can accumulate the twenty million dollars needed to build an appropriate home for the aliens when they land and make their existence known to the people of Earth. Until they come, Rael and his family are being asked to live in the residence (p. 175). And when they come, the Elohim will be sure to reward those who have donated (p. 102).
- Rael encourages unfettered sexual expression and promises—with language smoldering in sexism—that in the coming heaven on Earth deserving men will have access to the most perfectly formed and marvelously attentive females, including simultaneously one brunette, one blonde, one redhead, one black, one Chinese, and one other Asian. It is rumored that Rael has not been required to wait for the arrival of the Elohim to enjoy these benefits (indeed, he testifies he had done so during his visit to the Elohim's planet [pp. 168–71]).

Finally, before you convert, look at the adopted symbol of the Raelian movement: a six-pointed star (like the star in the flag of Israel) with a swastika set in its center! A few years after adopting this symbol, the Elohim (working only through Rael, of course) hoped to conclude a deal with the State of Israel to acquire a small acreage (with a radius of one kilometer) near Jerusalem where they could locate an embassy and residence—"the third temple" (p. 368)—with extraterritorial status in anticipation of their return. To help diplomacy, the Elohim requested that the central swastika be replaced with something more acceptable. Even so, the "stiff-necked" Israel authorities refused Rael's offer several times. I suspect they wanted nothing to do with him. In a change of heart, the Elohim concluded in their message of December 13, 1997: "The real Jews on Earth are no longer the people of Israel but those who recognize us as their creators and wish to see us return" (Rael, p. 359).

The Elohim now have cursed Israel and foresee its imminent destruction, advising Jews who have not returned to stay away so they will not suffer with those already there (p. 177). Sound similar to the complaints of the early Christians against the intractable Jews? Rael responded by restoring the symbol with its intertwined swastika within the star, which remains today the official symbol of the Raelian movement. As of this writing, the Raelian movement continues to search for a suitable site for its long-delayed embassy.

Note

1. An updated scripture with additional chapters was published in 2005, copyrighted by the Raelian Foundation: *Intelligent Design: Message from the Designers*. In this essay, all references to Raelism are taken from this book.

Mark Rubinstein has been a professor of finance (now emeritus) at University of California, Berkeley, since 1972. He is widely published and has won many awards for his research and teaching. In 1993, he was elected president of the American Finance Association. His intellectual interests have been varied, and in 2005 he made the singular decision to shift his research from finance to religion. His essays have been published in *Free Inquiry* magazine, for which he is now a regular columnist.

Scientific Methodology and Its Religious Parallels

If religious believers had a better understanding of scientific methodology and nonbelievers had a better understanding of its parallels with religion, they could have more meaningful discussions with each other.

CHARLES M. WYNN SR.

A paradigm is a set of assumptions, concepts, values, and practices that constitute a way of viewing reality for the community that shares them. The scientific community shares a paradigm according to which its hypotheses about the realities of the universe are derived ultimately from the data of observations and experiments and from the manipulation and analysis of these data according to logical procedures (Wynn and Wiggins 2001, 1–47).

Paralleling the observations upon which scientific hypotheses are based, religious "observations" are mainly revelations believed to be conveyed from God through prophets such as Moses, Jesus, and Muhammad, who speak from divine inspiration or as the interpreter through which God expresses his will. Separate beings known as angels are also believed to act as messengers. One such angel is Gabriel, who acts as the messenger of God in the Bible and the Qur'an (in which he is called Jibra'il). In the Bible, Gabriel is said to have appeared to Daniel (twice) (Daniel 8:15–26, 9:21–27)[1], to Zacharias (Luke 1:11–20), and to the Virgin Mary in the annunciation to her of Jesus's birth (Luke 1:26–38). In Islam, he is said to have revealed the Qur'an to Muhammad (Surah An-Najm 53:5)[2]. Personal revelation to individuals through prayer is also believed to be possible.

The messenger angel Gabriel appears in both the Bible and the Qur'an.

Revelations are believed to testify to the existence of an invisible, immaterial, and thus unobservable being called "God." If God is unobservable, what sort of "observation" can be made to support belief in God's existence? The answer: observation of the *effects* of such a being.

One such effect is said by religious believers to be the universe itself. They affirm that the universe must have been "caused" into existence by the first or uncaused cause: God the creator. According to them, the existence of a universe requires a preexisting supernatural intelligence. They present this cosmological argument as a conclusion deduced from two premises: Everything that had a beginning had a cause; the universe (cosmos) had a beginning; therefore, the universe had a cause.

A problem with this reasoning is that both premises are based on assumptions that there *had to be* a beginning; that the universe itself is not eternal (an eternal, self-sufficient universe would not require a preexisting

supernatural intelligence). This makes them both probabilistic, which means that the conclusion is also probabilistic and the reasoning process inductive rather than deductive. In addition, the argument assumes that God is an uncaused cause: nothing began God. A similar argument could assume that the universe itself is an uncaused cause.

Furthermore, the argument assumes that the universe could not have emerged by naturalistic means, i.e., self-created *ex nihilo* ("out of nothing"). One such naturalistic scenario describes the sudden appearance of matter composed equally of positive and negative energy: positive energy in the instance of material objects and negative energy in the generation of accompanying gravitational fields (Hawking 1988, 129). Evidence for antigravitational swelling that allegedly began a trillionth of a trillionth of a trillionth of a second after the cosmic clock started ticking has just been discovered by a team led by John M. Kovac of the Harvard-Smithsonian Center for Astrophysics. When combined mathematically, both forms of energy precisely cancel out each other, resulting in a "zero state."

When it does not adequately explain a set of observations, the assumption of science is that an adequate, superior naturalistic explanation will be forthcoming. Science chooses not to invoke supernatural explanations to fill gaps in naturalistic explanations. … Operational science takes no position about the existence or nonexistence of an omnipotent god.

Another argument for the reality of God is the teleological argument. Teleology is the study of design or purpose in nature. According to this argument, the reality of our structured universe suggests that its structural constraints had to have been deliberately imposed or designed by a designer, namely, God; that the basic physical constants of our universe were "fine-tuned" to allow us to exist and to observe the universe (the anthropic principle). The problem with this argument is that although the universe happens to be arranged in a certain way (happens to have an apparent design), this does not *ipso facto* require that this particular arrangement be the fulfillment of the intentions or actions of a designer. Like beauty, perception of design is created in the minds of beholders, i.e., it is subjective rather than objective. In addition, the particular arrangement of the universe can arguably be the result of purely naturalistic processes.

Religious Induction and Hypotheses

Science uses selected observations as premises to support a hypothesis, an attempted explanation of a set of observations made in order to draw out and test its logical or empirical consequences. The inductive reasoning involved in the formulation of a hypothesis uses those premises to support, but not to guarantee, the truth of the hypothesis. When the explanatory power of a scientific hypothesis is incomplete, i.e., when it does not adequately explain a set of observations, the assumption of science is that an adequate, superior naturalistic explanation will be forthcoming. Science chooses not to invoke supernatural explanations to fill gaps in naturalistic explanations. This of course does not rule out the *possibility* of supernatural intervention. Operational science takes no position about the existence or nonexistence of an omnipotent god.

Among the reasons that science restricts itself to materialistic explanations is its need to hold some variables constant in order to be able to test the role of others. If God is an omnipotent force that can choose when and how to intervene in the natural world, it would be impossible to hold such actions constant.

In the field of science, beliefs about reality are subjected to a rule of thumb known as Occam's razor. This maxim requires that a preferred scientific hypothesis be the one having the fewest assumptions that is consistent with the observations: complexity should not be proposed without necessity.

Nonbelievers argue that Occam's razor should also be applied to religious beliefs. They feel that including God in explanations of the universe adds an unnecessary element of complexity and that the universe can be explained entirely in naturalistic terms. While compelling, this argument in favor of simplicity cannot *rule out* complexity; a rule of thumb is not a rule of logic. On the other hand, religious fundamentalism applies Occam's razor when it concludes that the simplest explanation is God and that introducing scientific theories adds unnecessary elements of complexity.

The inductive reasoning used in deriving scientific hypotheses involves drawing inferences from what are taken to be facts or patterns of behavior in natural phenomena. In the area of religion, induction is employed when religious ideologies are derived from what believers assert is reliable information about the god revealed in holy scriptures. These include Orthodox, Conservative, Reform, and Reconstructionist Judaism; Catholic, Orthodox, Lutheran, Anglican, and Baptist Christianity; and Shia, Sunni, and Sufi Islam. Wars continue to be fought over which of these is the one true religion.

Religious Deduction, Prediction, and Experimentation

Determining whether the predictions deduced from hypotheses are borne out by experimentation is the ultimate test of hypotheses. Each time a valid prediction is borne out, the hypothesis gains credibility. Each time a prediction is not borne out, the hypothesis loses credibility and must either be modified accordingly and retested or rejected entirely and replaced by a better one.

Testing religious hypotheses (beliefs) about God requires a description of the qualities or power to be tested. For example, an omnipotent god should be able to answer prayers asking for something a person wishes to be done. In this sense, God's "yes" response to such petitions would be a miracle: a phenomenon in nature that transcends the capacity of natural causes and therefore must be attributed to the direct intervention of God.

Prayers are often made on behalf of people whose health is severely compromised. Many studies have been designed to evaluate whether or not such prayers result in measurable improvement in health. One such type of study focuses on the efficacy of "intercessory" or "distant" prayer, which involves people trying to heal others through prayers offered without the intended benefactors knowing it. Patients do not know whether anyone is praying on their behalf, so they are not subject to placebo effects in which belief in the efficacy of prayer influences the outcome of the experiment.

Most of these studies report no measurable difference in the improvement of the health of people who have been prayed for, versus those who have not been prayed for (Masters et al. 2006). Reports of studies indicating improvement in health through prayer are counterbalanced by reports that the health of people who had been prayed for actually worsened (Byrd 1998; Benson 2006)! In any event, the validity of such studies is doomed from the start because it can also be argued that God the Omnipotent responds to *all* prayer requests: When a request is granted, the answer is "Yes"; when it is not granted, God says "No" to the petitioner, i.e., denies the request.

Religious believers often cite fulfillment of biblical and Qur'anic prophecy as evidence for the validity of their scriptures. The sources of prophecy are people who are believed to have received revelations from God and subsequently recorded them in relevant writings. A well-known example of predictive prophecy is Isaiah 7:14, written between 701 and 681 BCE and said to have accurately foreshadowed the virgin birth of Jesus. In Isaiah 7:14, the prophet Isaiah addresses the "house of David," meaning the family and descendants of King David, and speaks of a virgin being pregnant with a child and giving birth to the child. Isaiah says this in the context of it being a sign from God. He also says that the child would be referred to as "Immanuel," which means, "God with us."

These believers assert that the New Testament books of Matthew and Luke offer evidence of the fulfillment of Isaiah's prediction. Matthew and Luke do record details involving the birth of Jesus (Matthew 1:18–25; Luke 1:26–38), who was born about 700 years after the time of Isaiah, saying that he was born of the Virgin Mary and is the son of God; because he is the son of God, Jesus literally can be referred to as "God with us." These citations, however, beg the question of whether Matthew and Luke's assertions about a virgin birth are themselves valid.

Absent reliable evidence, religious beliefs are faith-based beliefs: firm belief in something for which evidence is not required. The challenge of persuading people to give up beliefs they hold dear when solid evidence clearly indicates that they should is far more difficult than the problem of presenting this evidence clearly and understandably. No one is immune from at least some reluctance to be wrong, to change one's mind, to admit mistakes, and accept unwelcome findings. This reluctance is, naturally enough, all the more poignant when the stakes are possible loss of ultimate meaning or even eternal damnation. Thus, the subject should be approached with great care and sensitivity, understanding, and patience. ■

Notes

1. The Holy Bible, King James Version. New York: Oxford Edition: 1769.

2. The Noble Qur'an. Translated by Khan, M.M., and M.T. Al-Hilali. London: Dar-us-Salam Publications: 1999.

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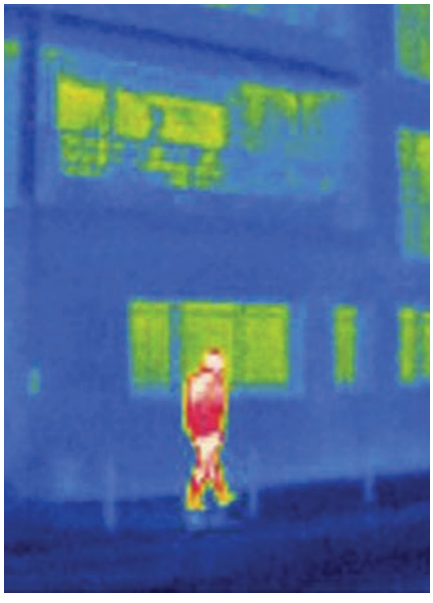
Thermal Imaging: Cold Hard Facts or Just Hot Air?

EVERETT A. THEMER

Thermal imaging cameras, originally developed in the 1950s for military use, have been successfully adapted for use in many other fields. These range from the obvious areas of law enforcement and surveillance to the construction and automotive industries. With advancements in the technology and growth in its popularity, both the costs and sizes of these cameras have shrunk, allowing even the average paranormal investigation group an opportunity to afford the technology. However, when using this equipment without the proper knowledge or training ghost hunters often interpret the images they record to fit their personal beliefs and investigation techniques, regularly touting the pictures and video that these cameras provide as definitive proof of paranormal activity.



Thermal imaging cameras do not show images as we see them in the visible light spectrum; they display images as temperature signatures of the objects in view of the camera lens. Looking at a typical room, environmental cold or warm spots such as next to windows and doors can be seen, residual heat left from people sitting on furniture or putting their hands on objects can be detected even after the person has left the area, and a living person or animal can be easily identified.

When using these cameras as ghost-hunting tools, paranormal investigators regularly record images of what they consider to be unexplained temperature irregularities. When that irregularity appears warmer than the surrounding ambient air temperature, some investigators often conclude that it is an indication of a ghost collecting or generating heat in an attempt to show itself. These investigators may later also assert that they have recorded a ghost when they locate an unexplained cold spot. Both beliefs, contradictory to each other, cannot apply in a scientific investigation. Allowing for the possibility that ghosts exist, it stands to reason that they would be governed by some ethereal laws of physics, meaning that if these hypothetical spirits are detectable through the use of thermal imaging cameras they would universally appear as either hot or cold spots.

To accept the idea that a spirit needs to draw energy from the environment in order to manifest as a hot spot suggests that an area of cooler air would be created around the supposed spirit as it pulls heat out of its surroundings. If the theory that a spirit would form a cold spot were true, the surrounding air temperature should fluctuate as heat is

pushed from the manifesting cold spot. Both of these scenarios suggest that ghosts would first appear as small irregularities and grow into larger anomalies, but most investigators seem only to observe already fully developed apparitions and not their actual formation. In the rare cases where the investigators do observe a growing anomaly, they often immediately regard it as evidence and fail to look for its potential causes.

If paranormal investigators cannot agree among themselves about what ghostly activity would look like through a thermal imaging camera, how can they present it to others—whether true believers or skeptics—as viable evidence? Confusing the issue even more, some ghost hunters bring religion and mythology into their investigations, claiming that ghosts appear as hot spots but non-human or demonic entities show themselves as cold spots. Ghost hunters also cannot seem to agree on the shape a spirit would assume on a thermal camera. Using other methods of imaging, investigators consistently put forth what they consider to be evidence of ghosts appearing as recognizable faces and figures, but they are then quick to claim that regardless of its shape or size, an anomaly recorded on a thermal imaging camera is evidence of a ghost, whether the image resembles a human figure or a grapefruit.

When a thermal imaging camera is used to view an area, the image is susceptible to a variety of factors. These factors include such things as the amount of sunlight let into the room over the course of a day, the type of heating and cooling systems used, and how weatherized the building is. These factors can affect the temperature of items in the area and create temperature variations in the air itself. Through the camera, these variations can appear as unexplained irregularities. When paranormal investigators find what they claim is a ghost, they rarely attempt to pinpoint a mechanical or environmental cause and simply record the anomaly and claim it as proof.

The images recorded by these cameras are based entirely on the varying environmental conditions of a location. These conditions are something that investigators are most often not familiar with or trained to interpret. Using thermal imaging cameras can create interesting and compelling images, but without proper training in their use as well as an understanding of the concepts of heat transference and reflection along with knowledge of the environmental tendencies of a particular location, calling the images that these cameras provide "evidence" has no proven scientific merit. ■

Everett A. Themer is an audio engineer and copywriter for a Midwestern marketing company. He wrote "Where Is the Science in Electronic Voice Phenomena?" in our November/December 2013 issue.

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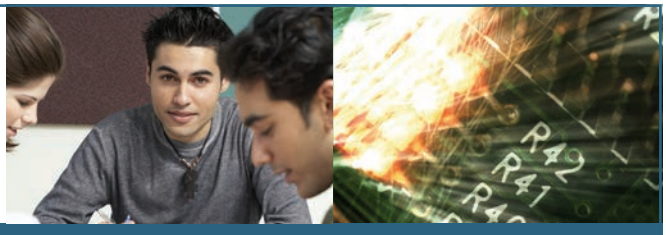

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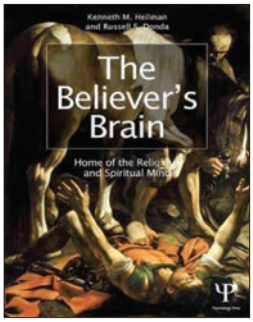
The Brain and Religious Belief: Analysis Disappoints

TERENCE HINES



***The Believer's Brain*. By Kenneth M. Heilman and Russell S. Donda.** Psychology Press, 2014. ISBN 978-1-84872-501-1. xiv + 146 pp. Paperback, $44.95

The title *The Believer's Brain* would lead one to hope for a fairly sophisticated analysis of brain function in religious individuals versus the nonreligious. Such an expectation is reinforced by the fact that the first author Kenneth Heilman is a well-respected neuroscientist who has made important contributions to the study of the neurological bases of cognition. Sadly, the book is a real disappointment. The ten chapters follow a common pattern. Each starts with discussion of well-known neuroscientific facts that would be found in any good introductory neuroscience text. These discussions are often lengthy and have little relationship to the purported topic of the book. At the end of the discussions there is a short section of Sunday supplement–level naive neurologizing attempting to apply the basic neuroscience results to explain some aspect of religious belief or behavior. Throughout the book there are unanswered questions, in the style of run-of-the-mill mystery mongers. You know the type—"Could the pyramids of Egypt have been built with the help of extraterrestrials?" For example, after a discussion (Chapter 8) of the role the frontal lobes play in divergent reasoning and how frontal-lobe damage leads to repeated use of failed cognitive strategies and re-emergence of infantile responses like the grasping reflex, the authors ask (p. 95), "Is the practice of religious fundamentalism … a mental equivalent of physical grasping behavior? Do religious extremism and unconditional adherence to religious doctrine result from a failure of a portion of the frontal lobe to develop fully or, if it is fully developed, to mature?" The authors never answer these or any of the other speculative questions they toss about.

Chapter 3, titled "More than Me," contains an especially bizarre example of the authors' style of reasoning. They report, correctly, that there are two anatomically different pathways in the brain that handle different aspects of visual perception. The ventral stream leads from the primary visual cortex in the occipital lobes down (note that word "down"—it'll be important in a minute) to the base of the temporal lobes. Neurons in this stream respond to specific objects. Thus, there are neurons that selectively respond to faces, body parts, colors, and shapes. This is known as the "what" pathway because these neurons help us identify what it is we're seeing. The other pathway, the dorsal one, also begins at the primary visual cortex and projects upward to the parietal lobes. Neurons here are more responsive to where an object is in visual space and its movement. It is termed the "where" pathway. In a feat of semantic legerdemain Heilman and Donda end up arguing that this anatomical difference between the "up" and the "down" streams is the origin of the belief that heaven is above us and hell below.

Throughout the writing is often clumsy and just a little off. Not exactly wrong but awkward. For example, the first sentence of Chapter 7 ("Circle the Wagons. Depression, Fear and Aggression") reads, "All animals, including humans, strive to improve their quality of life." I have a hard time imagining, say, a rat striving to improve its quality of life. This sentence betrays a confusion between maintaining a comfortable environment through homeostatic regulation, which all animals do, and a human motivation to improve one's lot in life. Such sloppy writing is all too

characteristic of the prose in this book. Factual errors are also too common. On page 44, the subjects in an experiment by Yellott are said to have been animals; in fact, the subjects were humans. On page 110, a unilateral stroke is said to cause blindness in the entire visual field. In fact, such a stroke causes blindness only in the visual field contralateral to the damaged area.

Chapter 7 also has a long discussion of the role of various brain areas, especially the amygdala, in fear and aggression. It is noted that functional imaging studies show greater amygdaloid activation when subjects observe pictures of people of races different than themselves. The chapter also points out that a huge amount of violence is perpetrated by followers of one religion against those of another. Therefore, the relationship between amygdala activation and religious violence is . . . *something*.

The chapter "On Spirituality" (Chapter 9) contains a disorganized discussion of the possible neuroanatomical bases of spiritual experience. The frontal lobes put in an appearance, followed by, as far as I can tell, a pointless description of approach avoidance behaviors. The default network is then introduced. This is a series of brain regions that are active when the person is focused inward, thinking about past experiences, daydreaming, mentally planning for something in the future but not responding to external stimulation. So maybe this series of structures has something to do with spirituality. But, maybe not. Maybe it's the temporal lobes. Here the authors do give a fairly coherent description of the evidence that ties spiritual experience to temporal lobe disorders such as epilepsy. They also briefly discuss the characteristics of several founders of major religions that suggest that they (Paul, Muhammad, etc.) suffered from epilepsy. This section could easily have been expanded. However, given the large amount of work that has been done on the possible neuroanatomical and neurophysiological bases of spirituality, this chapter leaves a great deal to be desired. As does the entire book, which contributes nothing to the understanding of this important topic. And the price of $44.95 is outrageous.

Terence Hines is professor of psychology at Pace University, Pleasantville, New York, and author of *Pseudoscience and the Paranormal.*

[NEW AND NOTABLE

Listing does not preclude future review.

HANDBOOK FOR THE AMATEUR CRYPTOZOOLOGIST. Brian D. Parsons. An experienced investigator of mysterious phenomena, Parsons sagely explains the importance of his book: "Just because there are no formal courses in cryptozoology does not mean you do not need an education to pursue this field." In this handbook, Parsons not only offers sound, practical investigation advice (tips on collecting evidence, tracking, interviewing witnesses, etc.) but also skeptical perspective on the subject that is often lacking in similar books. ("The fact that cryptozoology seems to protect itself from any criticism puts it into the pseudoscience category. . . . The healthiest thing the field of cryptozoology could do would be to listen to the criticism and find logical ways to address the lack of evidence or information to help validate claims.") Neither believing nor debunking, this is a refreshingly science-based cryptozoology investigation book informed by skepticism and critical thinking. PB Guy Productions, 2014, 174 pp., $15.00.

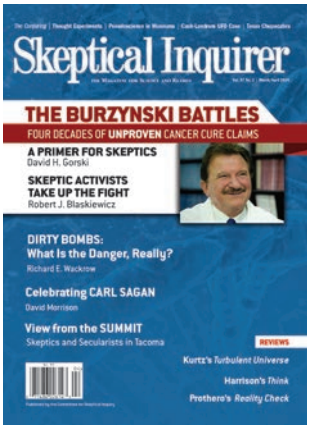
MASS HYSTERIA IN SCHOOLS: A Worldwide History Since 1566. Robert Bartholomew with Bob Rickard. Mass sociogenic illness—better known as mass hysteria—happens in many situations all over the world but is especially prevalent in closed social units such as schools. This book comprehensively surveys the colorful history of mass hysteria in schools, from outbreaks of demonic possession during witchcraft scares to twitching and shaking epidemics in nineteenth-century European schools, to more contemporary incidents of collapsing bands, itching frenzies, ghost panics, and mystery illnesses. Sociologist Robert Bartholomew has written extensively about mass hysteria in the pages of the SKEPTICAL INQUIRER, and Bob Rickard is a longtime researcher and founder of *Fortean Times* magazine. A fascinating and important discussion of a much misunderstood topic. McFarland, 2014. 225 pp., $40.00.

OSBOGO: Speaking to the Spirits of Misfortune. Ocha'ni Lele. A priest examines the role and concept of misfortune within the Afro-Cuban religion of Santeria. "Living in the world is enough to guarantee that at some point everyone must interact with osbogo," Lele writes, using the Yoruba word for spirits of misfortune. Through the use of divination and oracles, practitioners of Santeria seek to identify and correct the spiritual bases for their bad luck and ills. Though the material is interesting, it is often esoteric and mainly of interest to those who study religion, anthropology, and belief in modern magic. Destiny Books, 2014. 240 pp., $16.95.

PARADOX. Margaret Cuonzo. The latest in the MIT Press Essential Knowledge Series (titles that aim to introduce a complex subject to educated laypeople, a variation on the venerable ". . . For Dummies" franchise), *Paradox* (written by Cuonzo, an associate professor of philosophy at Long Island University) examines the nature of paradoxes: what they are, why they are important, and various approaches to solving them. A worthy read for philosophical skeptics and a good companion piece to William Poundstone's classic book *Labyrinths of Reason*. The MIT Press, 2014. 225 pp., $12.95.

REASON IN A DARK TIME: Why the Struggle Against Climate Change Failed—and What It Means for Our Future. Dale Jamieson. An explanation of what climate change is, why we failed to stop it, and why it still matters what we do. Centered in philosophy, the book also treats the scientific, historical, economic, and political dimensions of the problem. Jamieson, formerly affiliated with the National Center of Atmospheric Research, teaches environmental studies, philosophy, and law at New York University. He argues that our failure to respond significantly to climate change reflects the impoverishment of our systems of practical reason, the paralysis of our politics, and the limits of our cognitive and affective capacities. Oxford University Press, 2014, 266 pp. $29.95.

—Kendrick Frazier and Benjamin Radford



Burzynski Battles

If Stanislaw Burzynski actually succeeded in killing a patient with sodium ion ("The Burzynski Battles," March/April 2014), nothing could scream "Quack!" louder to a chemist. That is equivalent to administering a lethal dose of table salt. One bottle all at once of the pills illustrated would not be nearly enough.

Phenylacetic acid (PA) has the same acid strength as fruit acids, though its repulsive odor has been likened to fresh horse feces. It has potassium, calcium, and magnesium salts. These would all be physiologically equivalent with respect to PA. The acid is not very water soluble, and if it was injected there might be some problem getting a suitable soluble harmless salt, though some research would turn one up.

The material safety data sheet for PA does not imply kidney toxicity, though if a patient had poor kidney function for any reason it could lead to the high sodium level indicated. A competent doctor would be alert to kidney impairment and monitor the patient's sodium level.

Donald S. Matteson
Professor Emeritus of Chemistry
Washington State University
Pullman, Washington

Dirty Bomb Dangers?

Skeptics should be wary of Richard Wackrow's opinion that radioactive material is so difficult to deploy that it's insignificant as a viable terrorist threat against the United States ("What Is the Danger That Terrorists Will Attack the United States with a Nuclear or Dirty Bomb?" March/April 2014). A "dirty bomb" may or may not be practical, but scattering radioactive material over a fair-sized metropolitan area—say, lower Manhattan—would be easy and probably not even that risky to the terrorists involved if relatively low-grade or partially depleted material were used, or if it were disbursed (from underneath a vehicle, e.g.) from an original, shielded container. As Americans are now paranoid of anything even vaguely radioactive, the disruption this would create would be catastrophic, a "weapon of mass disruption" indeed. As to the availability of radioactive material, everything I've ever read suggests that vast quantities can now be found throughout the world, much of it poorly secured, and it's well known that our borders are porous to drugs and contraband of all sorts.

Cresson Kearny
Oakland, California

We need to be more concerned about a "dirty bomb" than Wackrow asserts, not because of the actual damage but because of its impact on the American public. Look at the reaction of Boston to the small bomb that killed "only" two people. The city shut down for days; what would have happened if the bomb contained some radioactive material? As Wackrow says, such material is easily available on the black market. As an engineer, I do believe in cost-benefit analysis for any government expenditure, but in this case Wackrow underestimates the cost, i.e., the reaction of the American public. If Wackrow's article could calm the public's reaction to a "dirty bomb" ("oh well, just a few people died, and we just have to stay out of downtown until it is cleaned up"), then I would say more power to him. I think the public is going to overreact; look at the country's reaction to the loss of only 3,000 lives and two large buildings on 9/11 ($3.3 trillion and a total change in our government)—30,000 people died on U.S. highways that year.

I think it would have been better for Wackrow to emphasis the minimal damage of such a bomb in order to calm public fear and then note its probability of happening as a side issue.

Walter Loewenstern, PhD
Los Angeles, California

Mr. Wackrow should know that anthrax is not a virus. Additionally, he implies that antibiotics would control the spread of a biological agent if it were used in a dirty bomb. If a viral agent were used that would not be correct.

John D. Long
Casselberry, Florida

Richard Wackrow replies:

Among the factors any cost-benefit analysis of counterterrorism measures should take into account are: to what degree our enemies are likely to consider an attack on U.S. soil, their ability to acquire or construct a weapon to do so and to recruit perpetrators, how much of the damage would be direct, how much of the damage would be inflicted by our or our leaders' reaction to the attack, and the related question of who profits from exaggerating the resourcefulness of our enemies.

I can only disagree with Mr. Kearny's assessment of the availability of fissile material to terrorists and leave it at that. However, if a "dirty bomb" is a viable threat, we have to ask why—more than twenty-five years after the first one was tested—a dirty bomb or similar device hasn't been detonated anywhere in the world. Further, as an indication of the wherewithal of our jihadist enemy, the only successful terrorist attack on U.S. soil since September 11, 2001, involving a "weapon of mass destruction," the Boston Marathon bombing, employed a crude explosive device.

In reference to Mr. Loewenstern's comment: A September 8, 2011, article in The New York Times *enumerating the $3.3 trillion cost of the 9/11 attacks oddly attributes the war in Iraq ($872 billion), the war in Afghanistan ($468 billion), and the $470 billion for homeland security and domestic intelligence to Osama bin Laden's "Planes Operation"—and not to decisions made by our leaders. The war in Iraq was strictly optional. Bin Laden had left Afghanistan by the end of 2001. And the extent of a counterterrorism-surveillance-industrial complex that is necessary to keep us safe is decidedly open to question.*

We can dicker over whether the lockdown of greater Boston was an appropriate short-term reaction to the Boston Marathon bombing. However, a major self-inflicted wound from the attack is Major League Baseball's decision to require all teams to implement "enhanced" security screening by 2015. So Mr. Loewenstern's comment raises the question of just who is overreacting, and again, who profits from keeping us frightened.

Regarding Mr. Long's comment about anthrax not being a virus, I stand corrected. Please pardon my sloppy biology.

Future Electronic Records

David Morrison says, "It makes the point of how limited the pa-

pers of contemporary scientists will be, since we write our manuscripts with word processors and communicate primarily by email, leaving few records for future historians" ("Library of Congress Celebrates Carl Sagan in Gala Event," March/April 2014). I thought once a document or photograph was entered into the electronic communication network, it was there permanently. We have been warned many times that once we post a document or image onto the World Wide Web, by email or other method, such as cloud storage, it is there forever and ever.

Young people are advised not to post embarrassing things that could be used against them years later; vacationers are advised not to post their travel plans or photographs, and even Christmas celebrations and birthday parties should not be mentioned on the web because thieves will break in and steal the presents. So why would scientific papers be lost? If we can keep the foolish pictures of people behaving badly at social activities, would not the scientific documents be kept forever too?

Elin Larson
Middleburg, Virginia

David Morrison replies:

The information we post on the Internet may indeed end up in some vast "big brother" depository in the cloud. Maybe our email is there as well, although I have never met anyone who has successfully retrieved an erased disk of email messages. But what I am concerned about losing is the working papers we have, especially drafts of articles and books, and the notebooks and calendars that record our daily activities. Not being posted on the Internet, I suspect these are lost forever.

Pseudoscience Creep

The problem of pseudoscience creep ("Pseudoscience Creep: Science Museums, Universities Host Pseudoscience," March/April 2014) is endemic in the Baby Boomer generation. Pseudoscientific beliefs are universal among the generational peers of the museum directors and medical school managers. "New Age" assumptions and inchoate "spirituality" are socially acceptable if not mandatory. Truth, professionalism, bad consequences, and absurdity—all are irrelevant. Being "judgmental" on those bases would be "intolerant." People have extreme difficulty actively rejecting anything, good, bad, major, minor, rational, irrational, disgusting, or absurd that is considered socially acceptable by people they live with. Man is a social animal first, a rational being at distant second.

This begs the question of why the Baby Boomers as a group are so pathetically susceptible to foolish and unsophisticated nonsense. I suspect the fact that they so strongly embrace the realization that though they were only young once, they can be immature all their lives, the mere fact that foolish ideas were held in contempt by the parental generation, the large number of poorly educated dropouts, and the effects of drug use on higher mental functions could all play a part. Beneath it all, I fear the demise of rural and village culture, where children grew up in intimate association with both parents and with the natural and adult worlds, has produced impaired generations ultimately unable to maintain civilization.

Norman P. Carlson
Busti, New York

Reality Check on Population Growth

Sometimes we go too far in our assessment of supporting data. In his review of *Reality Check* (March/April 2014), Peter Lamal shows the years that the world population passed different billion marks and described it as exponential rather than linear growth. Here are his data, along with my calculation of annual growth rates and amounts.

Year	Growth	Annual rate	Annual amount
1974	4 billion		
1987	5 billion	1.73%	76.5 million
1999	6 billion	1.53%	83.3 million
2011	7 billion	1.29%	83.3 million

Exponential growth is a constant annual rate of growth, and linear growth is a constant annual amount of growth. The data are a bit rough because the populations are in round billions, but this table shows growth to be much closer to linear than to exponential, in my opinion.

Don Keith
Waterloo, Ontario
Canada

Lamal's s review says that only 59 percent of adults know that dinosaurs and humans never coexisted. But is the truth even worse than that? Does that 59 percent include those who simply guessed correctly?

Dave Klement
Oconomowoc, Wisconsin

Parapsychologists' Research

I have read James Alcock's obituary of C.E.M. Hansel in the March/April 2014 issue of Skeptical Inquirer. While praising the work of Hansel in general, Alcock's account includes the following sentence: ". . . he dismissed the claims of parapsychologists in general, all the while ignoring the larger body of research that they had produced." This is pretty damning, and I feel that Alcock should explain what evidence Hansel is supposed to have ignored.

Thorsteinn Saemundsson
Science Institute
University of Iceland
Reykjavik, Iceland

James Alcock replies:

I am disappointed that my obituary honoring C.E.M. Hansel struck Professor Saemundsson as "pretty damning," for that was certainly not my intention. The comment that raised his concern—"all the while ignoring the larger body of research that they had produced"—was simply intended to reflect the fact that Hansel has been criticized for focusing on only a few key experiments and then going into elaborate detail on how they could have been compromised by trickery, while ignoring what some would argue is the strongest parapsychological research. This criticism has come not only from parapsychologists but from some leading skeptics as well. (Note the exchange between Ray Hyman and Hansel in the Skeptical Inquirer, Spring 1981; further comments by Hansel, Spring 1982.)

*Consider, for example, Hansel's original analysis of Helmut Schmidt's PK research. He analyzed a few of Schmidt's early experiments, which involved some of the weaker studies, and ignored the larger body of subsequent experimentation, which included what was arguably some of Schmidt's strongest research. Furthermore, by the time of the publication of Hansel's second book in 1980 (*ESP and Parapsychology: a Critical Re-evaluation*), a considerable number of experiments had been carried out using the Ganzfeld effect, and although this represents some of the most careful work ever carried out by parapsychologists, Hansel ignored that research completely. And while it is true that in the 1989 revision of this book, this time titled* The Search for Psychic Power, *he did devote some*

attention to Ganzfeld research as well as some of the more recent remote viewing and PK research, these analyses were relatively brief and superficial. (The exception to this was a chapter devoted to an in-depth analysis of one of Schmidt's very last experiments.)

Hansel played a very important role in articulating why parapsychology has failed in its quest to establish the reality of psychic phenomena. I do not have any doubt that he would have reached the same conclusion had he studied everything that parapsychology had produced. Yet, while I share his conclusion, it is fair comment, all things considered, to point out that it was based on the analysis of a relatively small number of studies that were not representative of the best parapsychological research. That is not meant to be damning; my intention was only to honor him.

Sylvia Browne's Death

I have been an ardent follower and subscriber of SI for more years than I like to think. Very many of the articles are very interesting for me, a few not so relevant, but who cares, and almost never have I been in disagreement. Not so now, either, but I want to make a remark on the "Death of a 'Psychic'" in the March/April issue. Not that I have not enjoyed the previous writings on this topic and said person, but maybe it is my age or cultural upbringing, that urges me to the keyboard. I have learned, that "*de mortuis nihil nisi bene*" i.e.: if you cannot say anything positive about a deceased person, then hold your tongue. Two pages of revengeful deprecatory writing on a newly dead opponent is not a worthy gesture from a quality publication such as SI. A short message about her departure (with a few references to previous articles in SI) would have been sufficient. Otherwise, keep up the good work!

Frits Schjøtt
Retired psychiatrist
Svendborg
Denmark

I am a longtime subscriber to Skeptical Inquirer. I am writing to say I found your publication of Bryan Farha's article about Sylvia Browne in the March/April 2014 issue reprehensible. I am in no way a fan of psychics, but attacking a deceased person for no discernible productive reason is inexcusable. There was nothing in the article that was news; all of Ms. Browne's fakery and scams that were discussed in the article have been revealed before. Her death creates nothing either threatening to or significantly enabling of the promotion of science and reason. To my read, the "rest in peace" message that ended the article was delivered with a sneer. I expect more of your magazine.

Meg Waraczynski
Whitewater, Wisconsin

Bryan Farha responds:

The two letters regarding my brief piece on "Death of a Psychic" have some merit. It's true that my tone was questionable. That was a choice on my part (not SI), for which I assume responsibility. It's on me. A few comments and clarification are in order, though:

Both Frits and Meg referred to my piece as an "article"—but this is not exactly accurate. The piece falls under the category of "News and Comment"—not an article. This is important because the SI Guide for Authors requests News and Comment pieces be written in "interpretive journalistic style." A Google search for "interpretive journalism" brings up the Blackwell Reference as the first result. It indicates, in part, that my job is to look for motives and make judgments—which is precisely what I did. Other definitions include the need for historical perspective. Rehashing negative history is very common for death-related journalistic pieces to do. For example, CNN's article "Michael Jackson dead at 50 after cardiac arrest" http://www.cnn.com/2009/SHOWBIZ/Music/06/25/michael.jackson/*) includes allegations of child molestation and charges of "four counts of lewd conduct with a child younger than 14; one count of attempted lewd conduct; four counts of administering alcohol to facilitate child molestation; and one count of conspiracy to commit child abduction, false imprisonment or extortion." Was CNN wrong to publish this? Should they have only focused on the positive and creative aspects of his performing talents? The factual historical perspective is relevant—even if Michael Jackson can't defend himself. If someone can demonstrate that my historical depiction of Browne was inaccurate, I wouldn't hesitate to submit an apology.*

Again, I'm responsible for the content and tone of the piece, but for the reasons stated (among others) I hope readers are willing to meet me halfway on this one.

Creationism in the Classroom

The March/April 2014 Skeptical Inquirer is impressive, as usual, with the depth and variety of articles. Of particular note was the recognition given to Eugenie C. Scott and Zach Kopplin for their work in keeping creationism out of the classroom.

Their efforts, however, suggested to me a "thought experiment." What if science teachers tried the opposite approach? Invite creationists to join them in designing a course on what answers people have invented for themselves and their children to questions about where we and the world came from—perhaps more of a humanities than a science course. It would include the myths of various cultures, including the biblical creation myth, and efforts at naturalistic explanations, including astronomers' account of the size, dimensions, and development of the universe and the Darwinian account of the evolution of life on Earth. Students would be encouraged to sharpen their critical thinking skills by examining the evidence for each of the views.

It would be interesting to see how intelligent might be the excuses the "creation scientists" could design to escape from the invitation.

David W. Briggs
Marion, Massachusetts

Hynek's Naiveté

In his informative chronology of UFO reports by J. Allen Hynek (January/February 2013) John Franch (page 52) did not describe the sighting of UFOs by a housewife in Charlottesville, Virginia (Bruce Martin, "An Eye-Opening Double Encounter," SI, Fall 1984, page 56). In April 1982 the local afternoon paper in Charlottesville reported a UFO sighting by would-be psychic Nannette Morrison. Two days later she announced a second sighting, not followed by the local paper.

The presence of a second sighting so impressed Hynek that he labeled it a "remarkable double encounter." Thus only two years before his death Hynek exhibits a most naive view of UFOs. Reportedly, he finally rejected the "remarkable double encounter." Nannette Morrison claimed psychic capabilities.

Bruce Martin
Palo Alto, California

Scientism

Exceptionally worthwhile articles by Susan Haack, thanks! ("Six Signs of Scientism" November/December 2013 and January/February 2014.)

Henry Bauer

Professor Emeritus of
Chemistry & Science Studies
Virginia Polytechnic Institute & State University
Blacksburg, Virginia

Attitudes about Religion

Christians in general and Old Testament Christians in particular deserve the "disdain, denigration, condescension, and dismissal" the Reverend Alterman is so shocked by (Letters to the Editor, March/April 2014)

Since I have no wish to "engender openness, responsiveness and acceptance" on the part of that community, I can see no reason for hiding my contempt. I am not the least interested in proselytizing. The very thought of which is especially abhorrent to me, since it smacks of the behavior that is the hallmark of so many of these Christians. They want to convert me. I, most certainly, do not want to convert them. Let them wallow in their own ignorance.

I am truly amazed at the thought that there may be atheists moved by missionary zeal, afraid to hurt Christian feelings, potentially going door to door with messages of hope for the poor benighted non-atheists.

Surely, atheism has grown beyond that infantile stage.

John A. Broussard
Kamuela, Hawaii

In his letter in response to another letter with respect to "New Atheists," Ian Alterman points out that not all Christians can be put in the same boat. He singles out what he calls "Old Testament Christians," opining that they often have "un-Christian positions," a charge which said Christians would surely dispute and perhaps themselves level at Mr. Alterman.

However, Mr. Alterman's general point, that one cannot paint all Christians with the same brush when it comes to their interactions with others who do not share their views, is a fair one. This makes it all the more notable when Mr. Alterman proceeds to do that very thing toward the scientific and skeptical communities, stating that "they must rethink the way they approach believers, and that this includes at least a modicum (if not more) of humility and civility."

If Mr. Alterman expects non-Christians to recognize that just because some Christians might be narrow-minded and difficult to deal with it does not mean that all of them are, he should extend that same humble civility to nonbelievers and refrain from lumping them all in together and implying that "disdain, denigration, condescension, and dismissal" are characteristic of scientists and skeptics in general.

Iain Fyffe
Fredericton,
New Brunswick, Canada

[FEEDBACK

The letters column is a forum on matters raised in previous issues. **Letters should be no longer than 225 words.** Due to the volume of letters we receive, not all can be published. Send letters as email text (not attachments) to letters@csicop.org. In the subject line, provide your surname and informative identification, e.g.: "Smith Letter on Jones evolution article." Include your name and address at the end of the letter. You may also mail your letter to the editor to 944 Deer Dr. NE, Albuquerque, NM 87122.

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SKEPTICAL ANNIVERSARIES

by Tim Farley

July 5, 1854: Wolfgang von Kempelen's Mechanical Turk, a chess-playing robot that was hoaxed and manipulated via a hidden chess master, was destroyed by fire.

July 5, 1989: *Newman v. Quigg*, a U.S. court case on the patentability of a perpetual motion machine, ended on appeal. The patent was denied.

July 16, 1969: The Apollo 11 astronauts took a picture of Earth containing a smudge that some claim is a UFO.

July 23, 1924: Harry Houdini attended a séance by the famous Boston spirit medium Margery. He left impressed—not by her mediumship but by her skill at trickery.

July 27, 1954: Chiropractor Volney Mathison was granted a U.S. patent on a device that would later be adapted to become Scientology's E-meter.

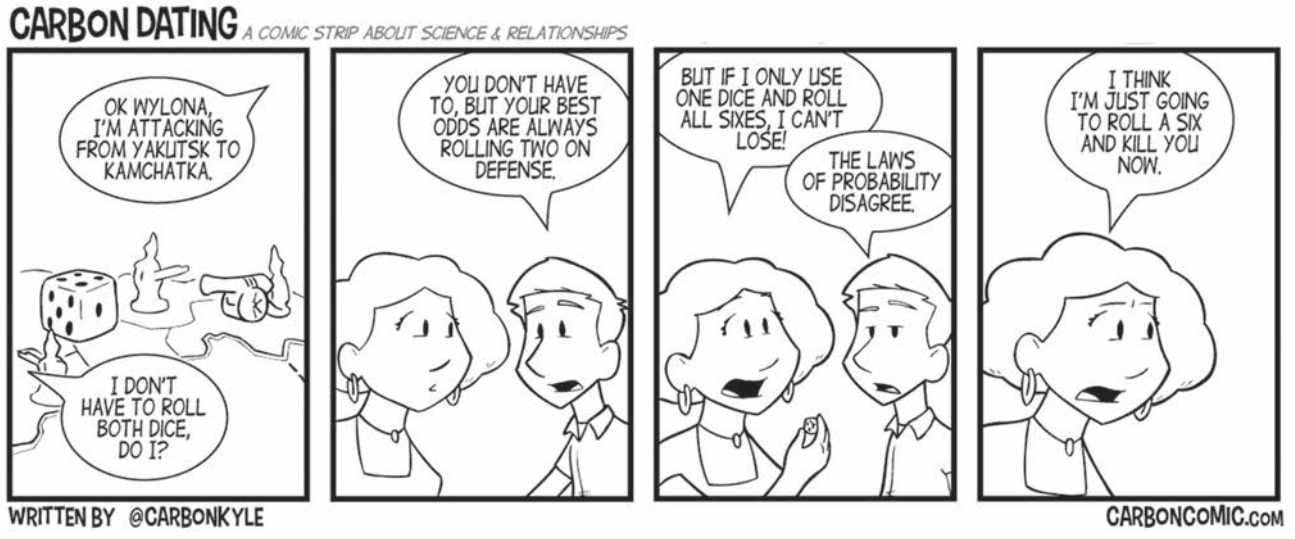
July 27, 1979: The film *The Amityville Horror*, an adaptation of a novel widely marketed as "based on a true story," was released in theaters.

July 31, 1974: Louisiana became the last state to legally license chiropractors.

August 18, 1634: French Catholic priest Urbain Grandier was burned at the stake as a witch after being accused of causing a famous case of mass possession by demon.

August 19, 1874: John Tyndall gave an address on materialism to the British Association for the Advancement of Science that started a controversy over the relationship between religion and science.

Tim Farley is the creator of the website whatstheharm.net and blogs at skeptools.com. He is a past fellow of the James Randi Educational Foundation.


CARBON DATING
A COMIC STRIP ABOUT SCIENCE & RELATIONSHIPS
OK WYLONA, I'M ATTACKING FROM YAKUTSK TO KAMCHATKA.
I DON'T HAVE TO ROLL BOTH DICE, DO I?
YOU DON'T HAVE TO, BUT YOUR BEST ODDS ARE ALWAYS ROLLING TWO ON DEFENSE.
BUT IF I ONLY USE ONE DICE AND ROLL ALL SIXES, I CAN'T LOSE!
THE LAWS OF PROBABILITY DISAGREE.
I THINK I'M JUST GOING TO ROLL A SIX AND KILL YOU NOW.
WRITTEN BY @CARBONKYLE
CARBONCOMIC.COM

MYSTERY SOLVED! PRESENTS: A MILO MOMENT
A LOT OF PEOPLE SAY TO ME, "MILO, THE ANTEDILUVIAN ASTRO-MAN THEORY IS HOOEY AND YOU KNOW IT."
TO WHICH I OFTEN SAY, "OH YEAH? WELL, IF ANTEDILUVIAN ASTRO-MEN DIDN'T VISIT EARTH, THEN WHERE DO MOON PIES COME FROM?"
GETS 'EM EVERY TIME.
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The organizations listed above have aims similar to those of the Committee for Skeptical Inquiry but are independent and autonomous. Representatives of these organizations cannot speak on behalf of CSI. Please send updates to Barry Karr, P.O. Box 703, Amherst NY 14226-0703.
International affiliated organizations listed at www.csicop.org.